National Energy Board
Office national de l'énergie

Reasons for Decision

Georgia Strait Crossing Pipeline Limited on behalf of **GSX Canada Limited Partnership**

GH-4-2001

November 2003

Facilities

Canada

National Energy Board

Reasons for Decision

In the Matter of

Georgia Strait Crossing Pipeline Limited

on behalf of

GSX Canada Limited Partnership

GSX Canada Pipeline application dated
24 April 2001

GH-4-2001

November 2003

© Her Majesty the Queen in Right of Canada 2003 as
represented by the National Energy Board

Cat No. NE22-1/2003-7E
ISBN 0-662-35221-1

This report is published separately in both official languages.

Copies are available on request from:
The Publications Office
National Energy Board
444 Seventh Avenue S.W.
Calgary, Alberta. T2P 0X8
E-Mail: publications@neb-one.gc.ca
Fax: (403) 292-5576
Phone: (403) 299-3562
1-800-899-1265

For pick-up at the NEB office:
Library
Ground Floor

Printed in Canada

© Sa Majesté la Reine du Chef du Canada 2003
représentée par l'Office national de l'énergie

N° de cat. NE22-1/2003-7F
ISBN 0-662-75043-8

Ce rapport est publié séparément dans les deux langues officielles.

Demandes d'exemplaires :
Bureau des publications
Office national de l'énergie
444, Septième Avenue S.-O.
Calgary (Alberta) T2P 0X8
Courrier électronique : bibliothèque@neb-one.gc.ca
Télécopieur : (403) 292-5576
Téléphone : (403) 299-3562
1-800-899-1265

Des exemplaires sont également disponibles à la bibliothèque de l'Office
(rez-de-chaussée)

Imprimé au Canada

Table of Contents

List of Figures iii
List of Tables iii
List of Appendices iii
Abbreviations iv
Recital and Appearances viii

1. Introduction 1
- 1.1 Project Overview 1
- 1.2 Joint Review Process 3

2. Facilities and Pipeline Safety 4
- 2.1 Facilities Description 4
  - 2.1.1 Marine Section 6
  - 2.1.2 Shore Crossing 6
  - 2.1.3 Terrestrial Section 7
- 2.2 Pipeline Design 7
  - 2.2.1 Codes and Standards 7
  - 2.2.2 Materials and Line Pipe 8
    - Marine Section 8
    - Terrestrial Section 9
- 2.3 Risk Assessment 11
- 2.4 Seismic Criteria 12
- 2.5 Geotechnical Matters 15
- 2.6 Management System, Quality Assurance Program and Integrity Program 17
  - 2.6.1 GSX PL Management System 17
  - 2.6.2 Quality Assurance Program 18
  - 2.6.3 Pipeline Integrity Management Program 18
- 2.7 Horizontal Directional Drill 20
- 2.8 Blasting 20
- 2.9 Operation 21
  - 2.9.1 Control, Monitoring, and Leak Detection 22
  - 2.9.2 Emergency Preparedness and Response 22
- 2.10 Third-Party Verification Process for the Marine Pipeline 23

3. Environment, Socio-Economic, Consultation, Routing and Land Matters 26
- 3.1 Environment 26
  - 3.1.1 Joint Review Panel Report 26
  - 3.1.2 Environmental Effects of Combustion of Gas at VIGP 26
    - Local and Regional Air Quality 27
    - Greenhouse Gas Emissions 30
  - 3.1.3 Response of the Government of Canada 35
- 3.2 Socio-Economic Matters 36

3.3 Public Consultation ... 38
3.3.1 Early Public Notification ... 38
3.3.2 Consultation with First Nations ... 38
3.4 Routing and Land Matters ... 42

4. Traffic, Tolls and Tariffs, and Financial Matters ... 45
4.1 Financial Matters ... 45
4.1.1 Project Financing ... 45
4.1.2 Corporate Structure ... 45
4.2 Ability of Proponent to Manage Risk and Financial Liabilities ... 46
4.3 Traffic, Tolls and Tariffs ... 47
4.4 Method of Regulation ... 47

5. Supply, Markets and Economic Feasibility ... 49
5.1 Justification for the Project ... 49
5.2 Gas Supply ... 50
5.2.1 Shipper-Specific Supply ... 50
5.2.2 Overall Supply ... 50
5.3 Markets and Need for the Proposed Pipeline ... 52
5.3.1 Demand for Gas on Vancouver Island ... 52
Background ... 52
Electricity Load-Supply Imbalance ... 52
Centra System ... 53
NorskeCanada ... 54
5.3.2 Price of Natural Gas ... 55
5.3.3 Public Versus Private Risk ... 56
5.4 Conclusion ... 57

6. Subsea Cables ... 59
6.1 Background ... 59
6.2 Relevance of the Evidence on the Subsea Cables ... 60

7. Overall Conclusion and Disposition ... 64
7.1 Conclusion on Public Convenience and Necessity ... 64
7.2 Disposition ... 64

List of Figures

1-1 Georgia Strait Crossing Project 2
2-1 GSX Canada Pipeline 5
4-1 GSX Canada Pipeline – Ownership and Operation 46

List of Tables

2-1 Estimated Costs (CDN $million) for the Project 6
3-1 Predicted Emissions Concentrations from the Harmac Mill and VIGP Together for the Combined 1995 and 2000-2001 Modelling Period 28

List of Appendices

I Summary of Events 65
II List of Issues 68
III Certificate Conditions 70
IV Government of Canada Response to the Joint Review Panel Report 80

Abbreviations

AFUDC	Allowance for Funds Used During Construction
Agreement	Agreement between the National Energy Board and the Minister of the Environment, released on 20 September 2001
API	American Petroleum Institute
Application	Georgia Strait Crossing Pipeline Limited application to the National Energy Board dated 24 April 2001
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for the Testing of Materials
BC	British Columbia
BC EAO	British Columbia Environmental Assessment Office
BC Hydro	British Columbia Hydro and Power Authority
BCUC	British Columbia Utilities Commission
BC WLAP	BC Ministry of Water, Land and Air Protection
Board or NEB	National Energy Board
°C	degrees Celsius
CAC BC	Consumers Association of Canada *et al*
Calpine	Calpine Canada
CCME	Canadian Council of Ministers of the Environment
CDN	Canadian
CEA Act	*Canadian Environmental Assessment Act*
Centra	Centra Gas British Columbia Inc.
CH_4	methane
CO_2	carbon dioxide
CSA	Canadian Standards Association

CSA Z662	*Canadian Standards Association Z662 Oil and Gas Pipeline Systems*
d	day
DFO	Fisheries and Oceans Canada
EHS	environment, health and safety
EPN	early public notification
EPR	emergency preparedness and response
EPRP	Environmental Protection and Reclamation Plan
FBE	fusion bond epoxy
GFR	*National Energy Board Guidelines for Filing Requirements, 1995*
GH-4-2001 proceeding	Proceeding pursuant to National Energy Board Hearing Order GH-4-2001 dated 9 November 2001 for the proposed GSX Canada Pipeline project
GHG	greenhouse gas
GJ	gigajoules
government response	response of the Government of Canada to the JRP Report
GSC	Geological Survey of Canada
GSX Canada LP	GSX Canada Limited Partnership
GSXCCC	GSX Concerned Citizens' Coalition
GSX OC	GSX Operating Company, LLC
GSX PL or the Applicant	Georgia Strait Crossing Pipeline Limited
GSX US Pipeline	US portion of Georgia Strait Crossing Project
HDD	horizontal directional drill
HFI-ERW	high frequency induction electric resistance welding
HVDC	high voltage direct current
IR	Information Request
ICP	Island Cogeneration Project

intervenors	intervenors in the GH-4-2001 proceeding
JRP Report	Joint Review Panel Report for the GSX Canada Pipeline Project, dated July 2003
JWA	Jacques Whitford Associates
KBR	Kellogg Brown & Root
km	kilometres
KP	kilometre post
kPa	kilopascals
kV	kilovolts
m	metres
mm	millimetres
Memorandum	National Energy Board Memorandum of Guidance dated 4 March 2002
MMBtu	million British thermal units
MMcf	million cubic feet
MPa	megapascals
MT	megatonnes
MW	megawattt
NBCC	National Building Code of Canada
NEB Act	*National Energy Board Act*
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NorskeCanada	Norske Skog Canada Limited
NPS	Nominal Pipe Size (inches)
OPR-99	*Onshore Pipeline Regulations, 1999*
psi	pounds per square inch
Panel	Joint Review Panel
Powerex	Powerex Corporation

proposed Pipeline or Project	GSX Canada Pipeline project
PM	particulate matter
QA	quality assurance
QMS	Quality Management System
RAs	federal Responsible Authorities
Reasons	GH-4-2001 Reasons for Decision
SCADA	Supervisory Control and Data Acquisition
Skeleem Recovery Centre	Skeleem Recovery Centre of the Cedar Lodge Society
SO_2	sulfur dioxide
SPEC/DSF	Society Promoting Environmental Conservation and the David Suzuki Foundation
Terasen	Terasen Gas (Vancouver Island) Inc.
TJ	terajoules
TransCanada	TransCanada PipeLines Limited
US	United States
VIATEC	Vancouver Island Advanced Technology Centre
VIEC	Vancouver Island Energy Corporation
VIGJV	Vancouver Island Gas Joint Venture
VIGP	Vancouver Island Generation Project
VIPLA	Vancouver Island Pipeline Landowners Association
VOC	Volatile Organic Compounds
Westcoast	Westcoast Energy Inc. (carrying on business as Duke Energy Gas Transmission Canada)
Williams	Williams Gas Pipeline Company, LLC
WCSB	Western Canada Sedimentary Basin
$\mu g/m^3$	micrograms per cubic metre

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* (the NEB Act) and the Regulations made thereunder;

AND IN THE MATTER OF the *Canadian Environmental Assessment Act* (CEA Act) and the Regulations made thereunder;

AND IN THE MATTER OF an application dated 24 April 2001 by Georgia Strait Crossing Pipeline Limited:

a) pursuant to Part III of the NEB Act for a Certificate of Public Convenience and Necessity to construct and operate a new natural gas pipeline and related facilities; and

b) pursuant to Part IV of the NEB Act for related toll and tariff authorizations;

AND IN THE MATTER OF National Energy Board Hearing Order GH-4-2001 dated 9 November 2001;

HEARD in Sidney, British Columbia on 24, 25, 26, 27 and 28 February 2003, and on 3, 4, 5, 6, 7, 10, 11, 12, 13, 17, 18 and 19 March 2003;

BEFORE:

E. Quarshie	Presiding Member
R.J. Harrison	Member
B. Williams, Q.C.	Member

APPEARANCES:

D.G. Davies B. Ho	Georgia Strait Crossing Pipeline Limited
W. Andrews T. Hackney K. Maher	GSX Concerned Citizens' Coalition
D.Anguish	Northern Pipeline Projects Limited
G.L. Bell	
J. Bomford	
J. Briggs	
A. Caldicott	

J. Campbell	
J. Clark	Department of Justice (on behalf of Environment Canada, Fisheries and Oceans Canada, and Parks Canada)
M. Dimozantos	
M. Doherty	Consumers Association of Canada et al.
W. Douglass	Gulf Crab Fishers Association
J. Dudley	
R. Dwyer	
D. Essig	Islands Trust Council
A. D. Fisher	
T. Howard	Society Promoting Environmental Conservation and the David Suzuki Foundation
R. Hughes	
J.F. Hugo	Braithwaite Estates Improvement District
C. Jones	Ministry of Energy and Mines, Province of British Columbia
D. Knowles	
C. Lennox	Vancouver Island Advanced Technology Centre
P. Marchant	
M. McLennan	
S. Miller D. Miller	Shadybrook Farm
J. Page	Alberta Department of Energy
J.L. Parker	
G.G.P. Shephard	
D. Skerik	
I. Smyth	Saturna Community Club

S. Vassilopoulos	Vassilopoulos & Williamson, LC
G. Walker	Arbutus Ridge Resident Ratepayers Association
B. Wallace	Norske Skog Canada Limited (NorskeCanada)
S. Washington Smyth W.C. Austin K. Dunster B. Hanson D. Bain G. Thornton	The Marine Coalition: Saturna Community Club, Pender Islands Conservancy Association, Salt Spring Island Conservancy, Saanich Inlet Protection Society, Georgia Strait Alliance, Canadian Parks and Wilderness Society, BC Chapter
J. Hanebury, Q.C. C. McKinnon M. Haug	National Energy Board

Chapter 1

Introduction

1.1 Project Overview

Georgia Strait Crossing Pipeline Limited (GSX PL or the Applicant), on behalf of GSX Canada Limited Partnership (GSX Canada LP), applied to the National Energy Board (the Board or NEB) on 24 April 2001, for:

a) a Certificate of Public Convenience and Necessity, pursuant to section 52 of the *National Energy Board Act* (the NEB Act), authorizing the construction and operation of the GSX Canada Pipeline (the Project or proposed Pipeline);

b) an Order, pursuant to Part IV of the NEB Act, designating the proposed Pipeline as a Group 2 pipeline for the purposes of toll and tariff regulation; and

c) any other relief as GSX PL may request or as the Board may deem appropriate pursuant to section 20 of the NEB Act.

The proposed Pipeline is the Canadian portion of the Georgia Strait Crossing Project, a new international pipeline that would enable natural gas to be transported from interconnections with Westcoast Energy Inc. (Westcoast)[1] and Northwest Pipeline Corporation at the Sumas, Washington/Huntingdon, British Columbia (BC) market hub to markets in northwestern Washington and on Vancouver Island, BC. (Refer to Figure 1-1, Georgia Strait Crossing Project.)

The proposed Pipeline consists of approximately 60 kilometres (km) of 406 millimetre (mm) outside diameter (NPS 16) natural gas pipeline and related facilities, from a point on the Canada-United States (US) border in Boundary Pass east of Saturna Island, BC to an interconnection with the existing Centra Gas British Columbia Inc. (Centra)[2] pipeline at a point west of Shawnigan Lake and south of Duncan on Vancouver Island.

The Georgia Strait Crossing Project is jointly sponsored by British Columbia Hydro and Power Authority (BC Hydro) and Williams Gas Pipeline Company, LLC (Williams). The estimated capital cost of the combined Canadian and US portions of the Georgia Strait Crossing Project is CDN $322.3 million. The estimated capital cost of the Canadian portion is CDN $139.3 million.

---

[1] Westcoast Energy Inc. is carrying on business as Duke Energy Gas Transmission Canada.

[2] The Centra pipeline was recently acquired by Terasen Gas (Vancouver Island) Inc.

Figure 1-1
Georgia Strait Crossing Project

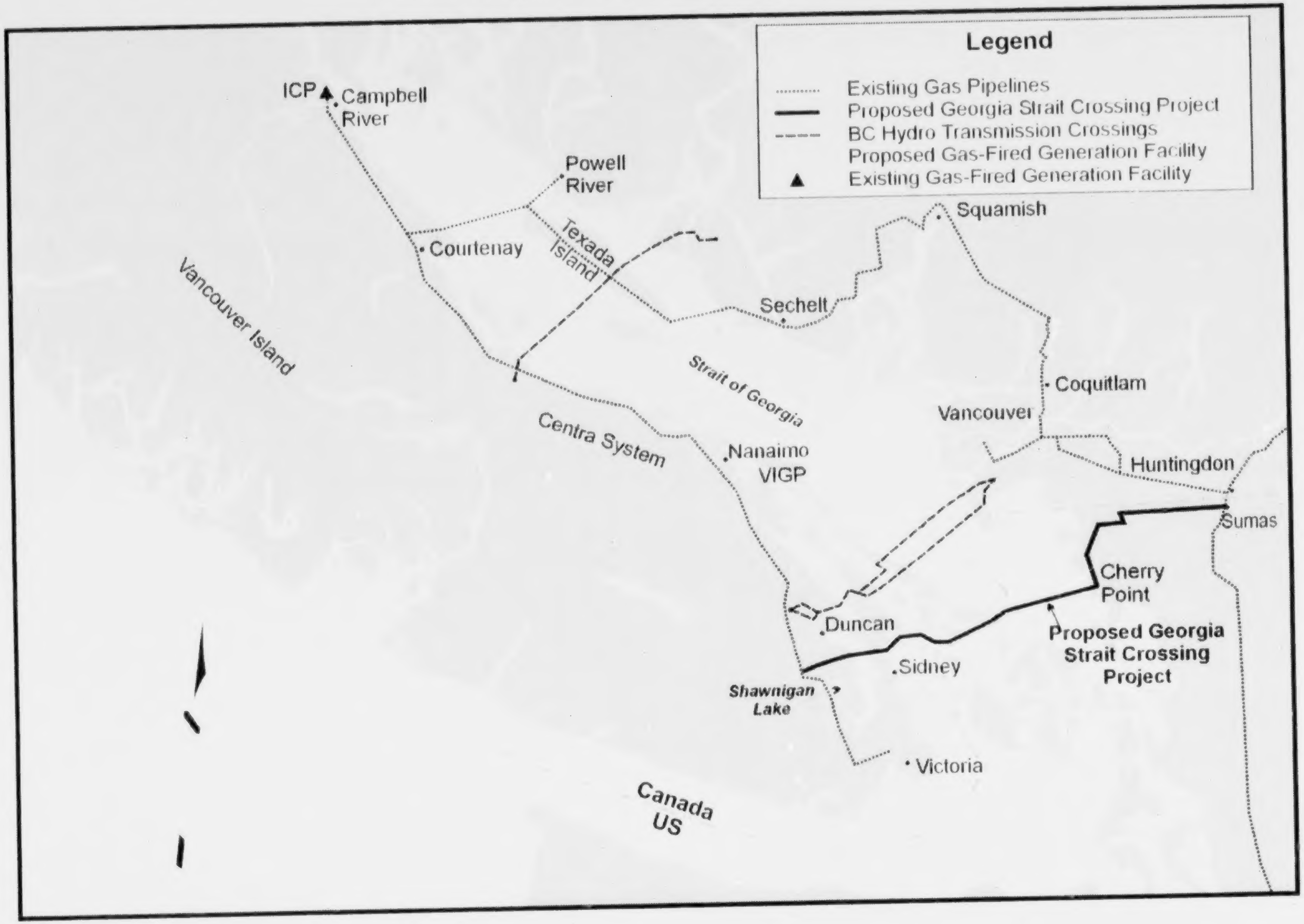
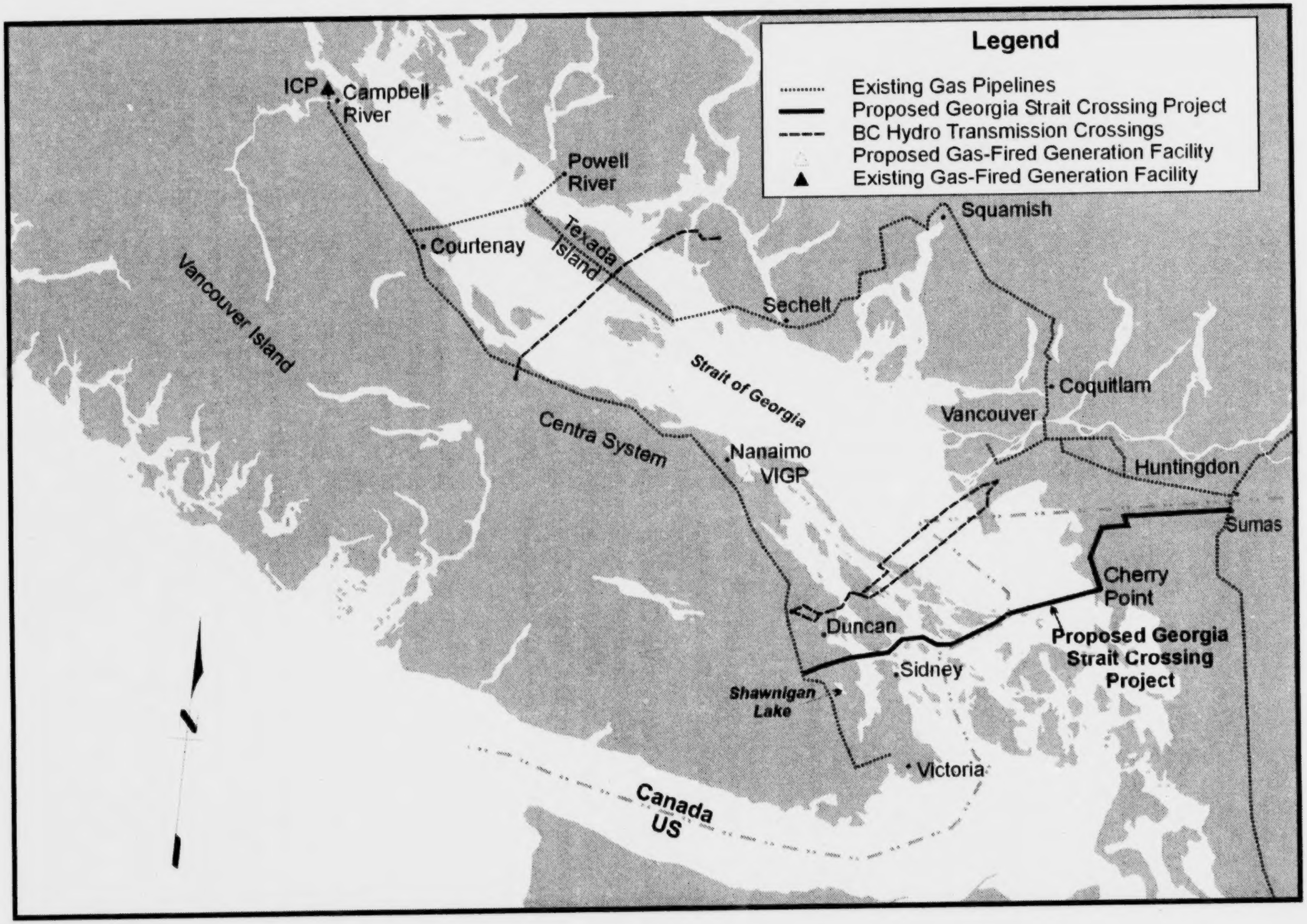

Legend
Existing Gas Pipelines
Proposed Georgia Strait Crossing Project
BC Hydro Transmission Crossings
Proposed Gas-Fired Generation Facility
Existing Gas-Fired Generation Facility
ICP
Campbell River
Powell River
Courtenay
Texada Island
Vancouver Island
Sechelt
Squamish
Strait of Georgia
Coquitlam
Vancouver
Centra System
Nanaimo
VIGP
Huntingdon
Sumas
Cherry Point
Duncan
Sidney
Shawnigan Lake
Proposed Georgia Strait Crossing Project
Victoria
Canada
US

Figure 1-1
Georgia Strait Crossing Project


Legend
Existing Gas Pipelines
Proposed Georgia Strait Crossing Project
BC Hydro Transmission Crossings
Proposed Gas-Fired Generation Facility
Existing Gas-Fired Generation Facility
ICP
Campbell River
Powell River
Courtenay
Texada Island
Vancouver Island
Squamish
Sechelt
Strait of Georgia
Coquitlam
Vancouver
Centra System
Nanaimo
VIGP
Huntingdon
Sumas
Cherry Point
Duncan
Proposed Georgia Strait Crossing Project
Sidney
Shawnigan Lake
Victoria
Canada
US

Gas from the proposed Pipeline would be used primarily to fuel the proposed Vancouver Island Generation Project (VIGP) facility to be located at Duke Point near Nanaimo, BC and the existing Island Cogeneration Project (ICP) at Campbell River, BC. The estimated capital cost of VIGP is CDN $370 million.

The US portion of the Georgia Strait Crossing Project (the GSX US Pipeline) would be constructed and operated by Georgia Strait Crossing Pipeline LP. On 20 September 2002, the Federal Energy Regulatory Commission issued Dockets CP010176-000, CP010177-000, CP010178-000 and CP010179-000, granting authorization to construct and operate the GSX US Pipeline and other related authorizations.

1.2 Joint Review Process

An independent Joint Review Panel (the Panel) was established by the NEB and the Minister of the Environment to coordinate the assessment of GSX PL's application under the *Canadian Environmental Assessment Act* (CEA Act) and the NEB Act. The Panel's Terms of Reference under the CEA Act were included in the agreement between the NEB and the Minister of the Environment (the Agreement) which was released on 20 September 2001. The Agreement outlined the scope of the review of the environmental effects of the Project and listed the factors to be considered under the CEA Act. Under the NEB Act, the Panel considered all other matters relevant to its determination of whether the proposed Pipeline was required by the present and future public convenience and necessity, including matters related to safety, economic feasibility and any environmental factors not considered under the CEA Act.

The Directions on Procedure for the GH-4-2001 proceeding were issued by the Panel on 9 November 2001. A summary of events in the GH-4-2001 proceeding is provided in Appendix I of these Reasons for Decision (Reasons). The issues identified by the Panel for its consideration of the Project are listed in Appendix II. An oral hearing was held in Sidney, BC from 24 February to 19 March 2003.

Under the CEA Act, the Panel conducted a review of the environmental effects of the Project and the appropriate mitigation measures. The Panel's conclusions and recommendations, including mitigation measures, follow-up programs and its rationale are set out in the Joint Review Panel Report (the JRP Report). The JRP Report also provides a summary of comments received from the public. The JRP Report was released on 30 July 2003 and forwarded to federal Responsible Authorities (RAs). The response of the Government of Canada to the JRP Report (government response) was coordinated by Natural Resources Canada and was approved by the Governor in Council pursuant to subsection 37 (1.1) of the CEA Act and released on 21 November 2003. A discussion of the JRP Report findings and government response is provided in Chapter 3 of these Reasons and a copy of the government response is provided in Appendix IV.

The Panel took into consideration the JRP Report and the government response before making its decision under the NEB Act. The Panel's overall conclusion and disposition are provided in Chapter 7 of these Reasons. The conditions for inclusion in the certificate are listed in Appendix III.

Chapter 2

Facilities and Pipeline Safety

2.1 Facilities Description

The proposed Pipeline would be constructed in three sections, a marine section in Boundary Pass and Satellite Channel, a shore crossing at Manley Creek and a terrestrial section on Vancouver Island. (Refer to Figure 2.1 - GSX Canada Pipeline.) The proposed Pipeline would be designed for a maximum operating pressure of 15 305 kPa (2,220 psi) to facilitate the efficient delivery of volumes into the Centra system and would have an initial design capacity of approximately 2.71 10^6 m^3 (101 TJ or 95.7 MMcf) of natural gas per day. It has an estimated capital cost of approximately CDN $139.3 million and is scheduled to be in service in October 2005. (Refer to Table 2-1 - Estimated Costs.)

The proposed Pipeline consists of:

- approximately 60 km of 406 mm outside diameter (NPS 16) natural gas pipeline;
- mainline block valves located just landward of the Vancouver Island shoreline and at an intermediate point between the landfall and the Centra interconnection;
- a line block valve/blow off assembly, an excess flow control valve, a check valve, a separator, pig receiving equipment, liquid handling/storage equipment and Multiple Address System radio equipment including a free standing tower approximately 44 metres (m) in height, located at the Centra interconnection;
- a Supervisory Control and Data Acquisition (SCADA) system linking the above facilities to control centres;
- permanent access roads, communications system and power supply as may be required to service mainline valve sites and other pipeline facilities; and
- temporary construction workspace, equipment laydown areas, and access roads.

The Applicant and intervenors filed a substantial amount of evidence on the design, construction, operation and safety of the proposed Pipeline. This chapter focuses on the key issues related to these matters that arose during the GH-4-2001 proceeding.

Figure 2-1
GSX Canada Pipeline

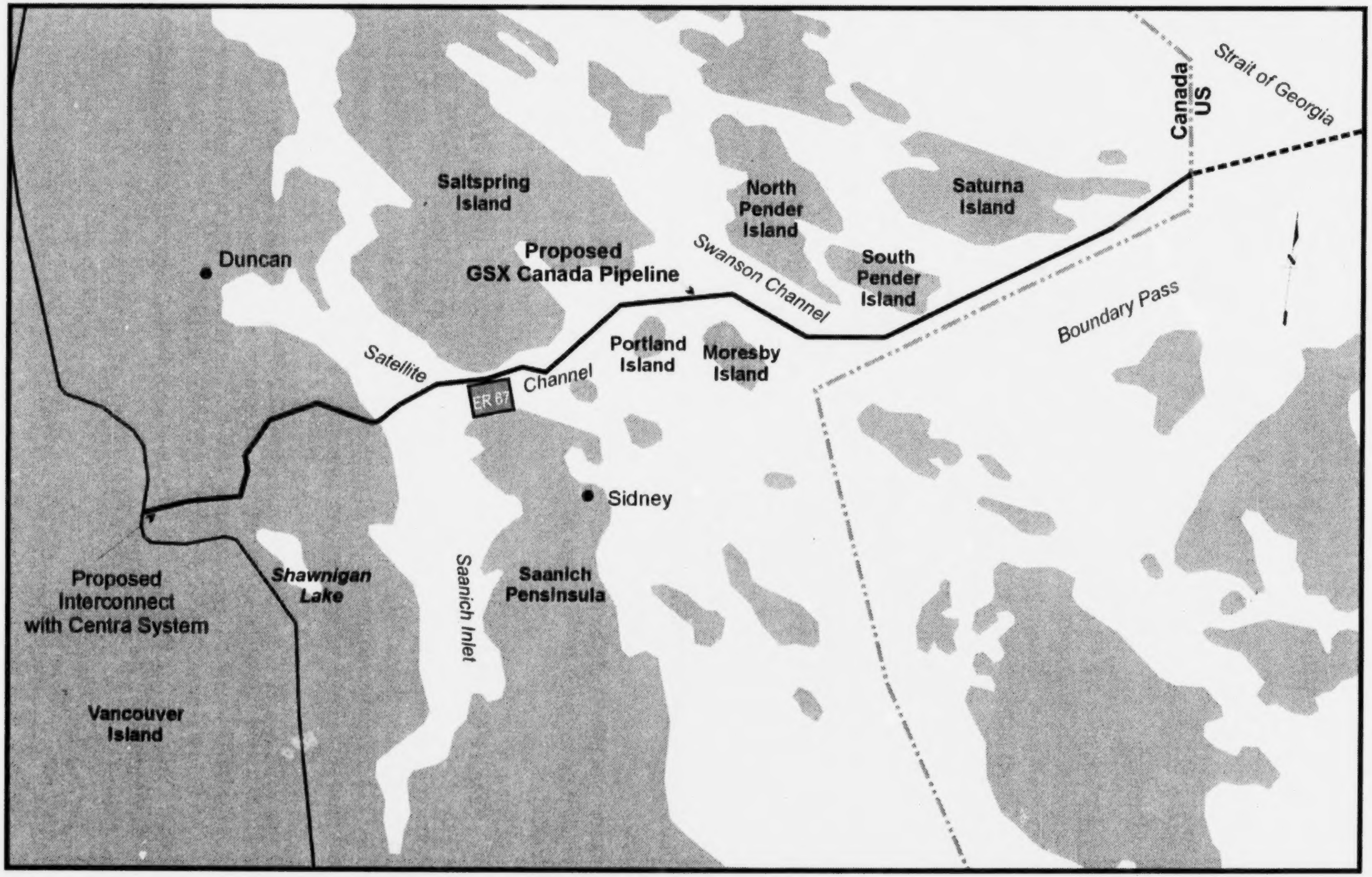

Strait of Georgia
Canada
US
Saltspring Island
North Pender Island
Saturna Island
South Pender Island
Duncan
Proposed GSX Canada Pipeline
Swanson Channel
Boundary Pass
Satellite
Channel
ER 67
Portland Island
Moresby Island
Sidney
Proposed Interconnect with Centra System
Shawnigan Lake
Saanich Inlet
Saanich Pensinsula
Vancouver Island

Figure 2-1
GSX Canada Pipeline

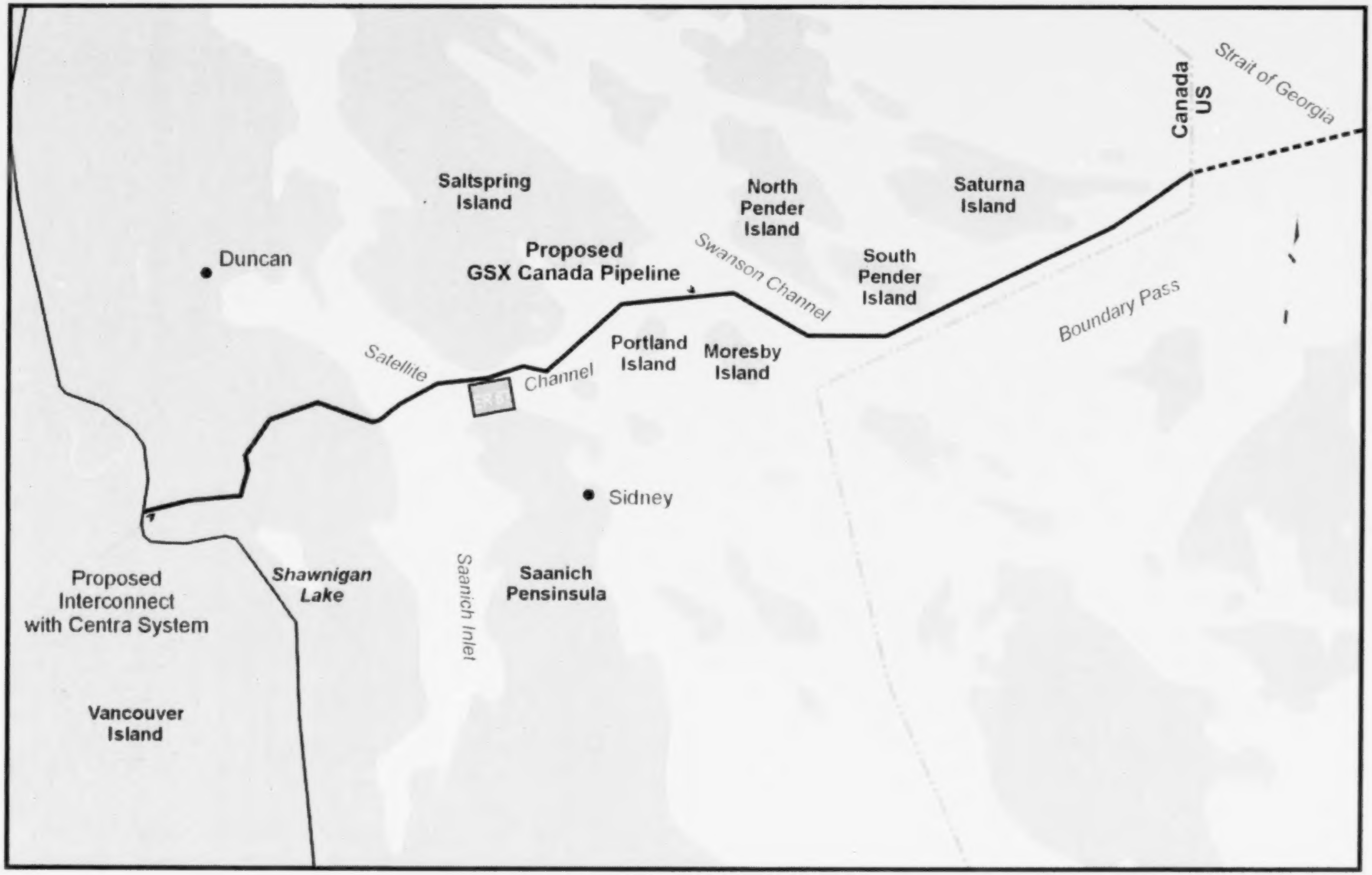

Canada
US
Strait of Georgia
Saltspring Island
North Pender Island
Saturna Island
Duncan
Proposed GSX Canada Pipeline
Swanson Channel
South Pender Island
Boundary Pass
Satellite Channel
Portland Island
Moresby Island
Sidney
Proposed Interconnect with Centra System
Shawnigan Lake
Saanich Inlet
Saanich Pensinsula
Vancouver Island

Table 2-1
Estimated Costs (CDN $million) for the Project

Description	Material	Installation	Land	Engineering	Total
Terrestrial Pipeline	$6.8	$14.8	$3.1	$9.2	$33.9
Marine Pipeline	$13.3	$50.8	$3.0	$27.0	$94.1
Overhead					$4.3
AFUDC[3]					$7.0
Total					$139.3

2.1.1 Marine Section

The marine section of the proposed Pipeline consists of approximately 44 km of 406.4 mm outside diameter steel pipe with no valves, branch connections, or other appurtenances included in the design. The marine pipeline facilities would commence on the international border, within Boundary Pass, at a point that is midway between East Point on Saturna Island, BC and the west end of Patos Island, Washington. From there, it would be routed in a southwesterly direction through Boundary Pass, north of Moresby and Portland Islands, and then through Satellite Channel to the landfall located 0.7 km northwest of Hatch Point at Manley Creek on Vancouver Island.

The marine pipeline would be laid from a barge using the s-lay installation technique whereby the welded pipe assumes an "s" shape as it exits the barge and descends in a controlled manner to the ocean floor.

2.1.2 Shore Crossing

The shore crossing would be located at Manley Creek, near Hatch Point, on Vancouver Island. GSX PL proposes to install the shore crossing using the horizontal directional drill (HDD) method. GSX PL indicated that the HDD method is preferred over trenching because of the minimal near-shore environmental impact associated with the HDD method of construction.

The HDD would commence in an upland area, approximately 230 m landward of the shoreline, and would exit approximately 430 m offshore, at approximately 21 m water depth. The total length of the HDD would be approximately 660 m. The HDD would have a minimum depth of cover of 15 m in the near-shore and coastal bluff area. Refer to Section 2.7 - Horizontal Directional Drill, of these Reasons and Section 4.2 - Effects at Landfall and in the Nearshore Marine Environment of the JRP Report.

---

[3] Allowance for Funds Used During Construction

2.1.3 Terrestrial Section

The terrestrial section of the proposed Pipeline consists of approximately 16 km of 406.4 mm outside diameter steel pipe, valves and other related facilities as listed in Section 2.1 of these Reasons. The terrestrial section would commence approximately 0.7 km northwest of Hatch Point on Vancouver Island. From there it would be routed generally southwest for approximately 16 km to interconnect with the Centra system at a point located approximately 1 km west of the west arm of Shawnigan Lake, south of Duncan, BC.

The Centra interconnect is the only interconnection point in Canada for the proposed Pipeline. A proposed Centra facility, which is not part of GSX PL's application, would include a custody transfer meter, downstream pressure control, primary flow control, heating, separation, filtration, and chromatography equipment. Centra would be responsible for odorization of the gas stream that enters its system.

2.2 Pipeline Design

2.2.1 Codes and Standards

The key codes, regulations and standards that have been incorporated into GSX PL's proposed Pipeline design include:

- NEB *Onshore Pipeline Regulations, 1999* (OPR-99);
- Canadian Standards Association (CSA) W178.1 Certification of Welding Inspection Operations;
- CSA W178.2 Certification of Welding Inspectors;
- CSA Z245.1-98 Steel Line Pipe;
- CSA Z245.11-96 Steel Fittings;
- CSA Z245.12-96 Steel Flanges;
- CSA Z245.15-96 Steel Valves;
- CSA Z245.20-98 External Fusion Bond Epoxy Coating for Steel Pipe;
- CSA Z245.21-98 External Polyethylene Coating for Steel Pipe;
- CSA Z662-99 Oil and Gas Pipeline Systems;
- American Petroleum Institute (API) Recommended Practice 1111 Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipelines;
- API Standard 1104 Welding of Pipelines and Related Facilities;
- API Specification 5L Specification for Line Pipe;
- American Society of Mechanical Engineers (ASME) B31.8 Gas Transmission and Distribution Piping Systems;
- American Society for the Testing of Materials (ASTM) 370 Charpy V-Notch Test Requirements;

- ASTM E436 Drop Weight Tear Test Requirements;
- Det Norske Veritas Offshore Standard OS-F101 Submarine Pipeline Systems (2000); and
- CSA C22.1-98 Canadian Electrical Code, Part 1.

GSX PL stated that the marine section of the proposed Pipeline would be designed to meet the applicable codes and standards of both Canada and the US. The primary design codes being used for the marine section are API 1111 for the system design and API 5L for the line pipe. GSX PL also stated that in all cases the design, construction, and operation of the marine and terrestrial sections of the proposed Pipeline would meet or exceed requirements of OPR-99 and CSA Z662. CSA Z662 incorporates by reference a series of industry standards and practices for materials, components, and construction. GSX PL further stated that it would comply with other federal, provincial, and municipal codes and regulations where applicable. Where a conflict between the requirements of the various key codes or standards may exist, GSX PL committed to use the more stringent of the codes for establishing the minimum project criteria.

2.2.2 Materials and Line Pipe

GSX PL stated it would purchase line pipe solely from manufacturers whose facilities and procedures it has qualified and found to be acceptable. Manufacturers would be required to have a quality assurance system, manuals, and procedures in place to qualify as an approved supplier to GSX PL. GSX PL representatives would monitor the forming, welding, testing, inspection, coating, and shipping of line pipe during the production process. Final acceptance of line pipe would be dependent upon the validation of key manufacturing activities, including laboratory testing, non-destructive inspection, pressure testing, and the review of the manufacturer's quality control programs and records.

Marine Section

GSX PL submitted that the marine line pipe would be manufactured using one of three manufacturing processes: longitudinal double submerged arc welded (DSAW); high frequency induction electric resistance welded (HFI-ERW); or seamless (SMLS) pipe. The steel would be of a low carbon, low alloy type, manufactured with controlled rolling practices to improve strength, ductility, weldability, and toughness properties. The marine pipe would be 406.4 mm outside diameter, grade 414 MPa, and have a minimum wall thickness of 16.7 mm. All sections of pipe would be externally coated with a layer of fusion bonded epoxy (FBE) overlain by an additional rough layer of FBE. The rough FBE layer would provide better adhesion for a concrete coating that would be added to provide buoyancy control and external protection for the pipeline. Bracelet type aluminium alloy anodes would be attached to the pipeline at regular spacing for corrosion inhibition.

During the course of the hearing, GSX PL added the HFI-ERW process to its options for the manufacture of the line pipe. GSX PL maintained that the use of HFI-ERW pipe is appropriate in high strain applications if a high degree of care is taken during the development of specifications for material and pipe and during the manufacture of the steel and the pipe. GSX PL indicated that it would implement quality control programs during the manufacture of the pipe.

With respect to pipe response to seismic hazards, GSX PL provided a Seismic Design Analysis report prepared by Technip Offshore Engineering Inc. (Refer to Section 2.4 - Seismic Criteria, of these Reasons.) Appendix D, Item 2 of the Seismic Design Analysis report, written by Dr. C. Langner, indicated that the bending strains[4] on the marine section of the proposed Pipeline as a result of estimated seismic loads would be similar in magnitude to those typically encountered in the reel-laying of offshore pipelines. It also indicated that butt welds on HFI-ERW pipe may be vulnerable to cracking under large strains. Dr. Langner strongly recommended that full-scale bending tests be performed on actual welded samples of the pipe to determine whether weld cracking is an issue with HFI-ERW pipe. The report stated that the tests should simulate field conditions as closely as possible, with bending strains at least as large as those anticipated under worst-case loading conditions, and that the pipe should not leak or otherwise fail if subjected to bending strains up to 5.0 per cent under monotonic loading.[5]

GSX PL also retained D.G. Honneger Consulting to conduct a review of the seismic design methodology. Dr. Honneger's review provided recommendations with respect to the conclusions in the Seismic Design Analysis report and the specifications for welding and quality control. The review indicated that welding procedures and welding inspection specifications should ensure weld overmatching.[6] It further indicated that measures such as the determination of project-specific weld acceptance criteria, screening test methodologies, and validation testing should be taken to ensure adequate strain capacity.

In response to Information Requests (IRs) from the Panel, GSX PL provided examples where HFI-ERW pipe has been used in onshore and offshore pipelines; however, it did not specify whether any of the pipelines provided in the examples were specifically designed to perform under large strain conditions, as may occur in zones of high seismic activity along the proposed Pipeline route. GSX PL stated that it would perform a number of tests prior to the commencement of construction, including full-scale bending tests of pipe sections and welds, to demonstrate the suitability of the HFI-ERW pipe and specifications for high strain conditions. GSX PL accepted any resulting financial risk if the testing revealed that the pipe and weld tests or specifications did not meet the performance goals.

Terrestrial Section

While much of the area to be traversed by the terrestrial section of the proposed Pipeline is used for agricultural and forestry purposes today, it has the potential for future commercial and residential growth. GSX PL stated that for this reason the entire terrestrial section of the proposed Pipeline would be designed, constructed, and tested in a manner commensurate with the Class 3 location requirements of CSA Z662.[7] The terrestrial pipe would be 406.4 mm outside diameter, grade 483 MPa, and have a minimum wall thickness of 14.3 mm.

---

[4] Strain is an increase or decrease in a given dimension of a material expressed as a percentage of the original dimension.

[5] A monotonic load is one that is applied in a continuous nonstop manner with no reversal in direction.

[6] Weld overmatching is the practice of ensuring that the weld is stronger than the metal that it joins.

In the development of an appropriate approach to fracture control design for line pipe, GSX PL stated that it addressed the following primary issues:

- initiation of rupture from a through-wall flaw;
- initiation of rupture from mechanical damage defects;
- prevention of brittle fracture propagation; and
- restriction of the maximum length of potential ductile fractures.

In addition to the mainline block valve at the Centra interconnection, there would be a mainline block valve just landward of the shore crossing and another block valve approximately halfway between the shore and the Centra interconnect, consistent with the valve spacing requirements for a Class 3 location. The valves would be 406.4 mm through-conduit valves with a rated working pressure of 15 305 kPa (2,220 psi). Through-conduit type valves would permit the passage of utility and inspection pigs. GSX PL would install its own control valve upstream of the Centra interconnection.

Fittings contained in the mainline may consist of tees, elbows, transition pieces, valves, and flanges. The materials in the terrestrial section of the proposed Pipeline would be required to provide adequate toughness, ductility, and weldability at rated minimum operating temperatures (-5° C buried and -45° C above grade). Special dimensional checks and non-destructive tests would also be required.

Views of the Panel

The Panel notes that the marine and terrestrial sections of the proposed Pipeline would be designed and constructed in accordance with CSA Z662 and OPR-99. However, the code and the regulations do not specifically address requirements for seismic criteria, seismic design or geotechnical design. The Panel has addressed these matters in Section 2.4 - Seismic Criteria and Section 2.5 - Geotechnical Matters of these Reasons.

The Panel notes that the marine section of the proposed Pipeline could be subject to large strains and, at this time, has reservations about the possible use of HFI-ERW pipe. GSX PL's evidence did not include any examples where HFI-ERW pipe has been used in large strain conditions, nor did it adequately demonstrate that the HFI-ERW pipe produced to Williams' pipe specifications would perform appropriately under large strain conditions. The Panel is of the view, therefore, that additional testing should be conducted prior to the commencement of construction in the event that GSX PL chooses to use HFI-ERW pipe for the marine section of the proposed Pipeline. The testing should be consistent with the recommendations in Appendix D of the Seismic Design Analysis report prepared for GSX PL by Technip Offshore Engineering Inc., consistent with the D.G. Honneger Consulting review of the seismic design methodology, and as committed to by GSX PL.

---

[7] In accordance with CSA Z662, class location designations are determined on the basis of the buildings, dwelling units, places of public assembly and industrial installations contained in class location assessment areas. Assessment areas are 1.6 km long and extend 200 m on both sides of the centerline of the pipeline. Assessment areas that contain 46 or more dwelling units are designated as Class 3 locations for the purpose of determining various design factors. CSA Z662 also states that consideration shall be given to designating areas that contain institutions where rapid evacuation may be difficult, such as hospitals or nursing homes, as Class 3 locations.

The Panel is of the view also that, should HFI-ERW pipe be selected, its use must be independently assessed and verified as appropriate for the conditions, loads and strains to which it would be subjected. The Panel will therefore require as a certificate condition that the Scope of Work for the verification of the marine section of the proposed Pipeline include special provisions to assess the specifications, tests and quality of the HFI-ERW pipe and confirm that HFI-ERW pipe is appropriate for the intended service. (Refer to Section 2.10 - Third Party Verification Process for the Marine Pipeline, and Condition 4 in Appendix III of these Reasons.)

2.3 Risk Assessment

GSX PL stated that risks are identified, assessed and mitigated primarily in the design, construction and testing phases of a pipeline and that, by meeting or exceeding all of the requirements for pipeline safety prescribed by government regulations and industry standards, the Project would meet or exceed established "accepted risk" criteria. GSX PL submitted that accepted risk, in this case, is defined by the societal processes that have produced the regulations that GSX PL used, and would use, to design and operate the proposed Pipeline.

GSX PL stated that risk assessment is done to identify mitigation measures that could possibly be implemented to reduce the risk of any segments of the pipeline that are rated as relatively high compared to the rest of the pipeline. GSX PL further stated that it used risk analysis combined with cost benefit criteria and professional judgment to determine if mitigative measures were warranted.

GSX PL submitted a relative risk assessment report on 30 January 2003 for the marine and terrestrial sections of the proposed Pipeline and stated that it followed the guidelines of OPR-99 and CSA Z662. The risk assessment report contained an identification of the hazards and consequences, the frequency and consequence analysis, an estimation of the risk and a risk evaluation that ranks each 305 m (1000 foot) segment of the proposed Pipeline relative to every other 305 m segment of the pipeline.

GSX PL stated that it reviewed 40 offshore hazards, the majority of which fell under potential ground movement and third party damage. GSX PL further stated that five offshore-related consequence variables were defined and the majority of these related to environmental consequences. The risk assessment found little variation in risk due to the marine pipeline's proposed deep location. GSX PL submitted that no further risk mitigation measures were necessary for the marine section of the proposed Pipeline as the risk for those segments having the highest relative risk was found to be acceptable.

GSX PL used a 500 m zone on both sides of the terrestrial section of the proposed Pipeline to describe the area that could be affected by a pipeline failure. The 500 m zone encompassed the Evergreen Independent School and also the nearby Skeleem Recovery Centre of the Cedar Lodge Society (Skeleem Recovery Centre). Concern was expressed by some intervenors, including GSX Concerned Citizens' Coalition (GSXCCC), regarding the proposed Pipeline's proximity to the Evergreen Independent School, and the impact of thermal radiation that would result from a pipeline rupture and subsequent ignition of the natural gas. At the hearing, GSX PL submitted a report entitled Quantitative Risk Calculations for GSX Pipeline that provided estimates of risks and would be used in emergency response planning.

GSX PL indicated that the design of the terrestrial section of the proposed Pipeline, which is for a Class 3 location designation,[8] meets the appropriate standards for a pipeline passing by facilities such as the Skeleem Recovery Centre and the Evergreen Independent School. GSX PL submitted that the risk assessment results were reasonable and within expected risk score ranges relative to other pipelines, and that no additional risk mitigation measures were required.

Views of the Panel

> The Panel is of the view that GSX PL has taken an acceptable approach to identifying and assessing the hazards associated with the marine and terrestrial sections of the proposed Pipeline. The Panel notes that the terrestrial section of the proposed Pipeline has been designed for the requirements of a Class 3 location designation, which meets or exceeds the requirements of CSA Z662 for the types of development anticipated along the pipeline route, including schools and institutions where evacuation may be difficult.

2.4 Seismic Criteria

GSX PL submitted a number of seismic and geotechnical reports during the GH-4-2001 proceeding, including a Geotechnical Summary Report prepared by Jacques Whitford Associates (JWA). The Geotechnical Summary Report indicates that the pipeline route lies in a tectonically complex region of high seismic activity. It further indicates that the region is affected by crustal, subcrustal and subduction megathrust earthquakes related to the zones of interaction between the Pacific, North American and Juan de Fuca tectonic plates.

Crustal earthquakes occur at depths between 10 and 25 km beneath the southern Strait of Georgia and account for about 90 per cent of the small earthquakes experienced in the Vancouver region. Subcrustal earthquakes originate within the subducting Juan de Fuca Plate and are generally of greater magnitude than crustal earthquakes. Subcrustal earthquakes occur off the west coast of Vancouver Island and in a band below the Strait of Georgia and Puget Sound, at depths between 45 and 65 km. Subduction megathrust earthquakes are rare but can be of very large magnitude. The eastern limit of the zone of potential deep tectonic movement that would result in a subduction earthquake coincides with the west coast of Vancouver Island.

---

[8] Refer to Footnote 7 on page 10.

GSX PL's Geotechnical Summary Report indicates that the proposed Pipeline would be designed to withstand geotechnical loading, including the effects of earthquake induced soil liquefaction,[9] slope movement and faults. For the terrestrial section of the proposed Pipeline, the Geotechnical Summary Report indicates that there are no known fault traces, that ground movement based on fault offset is unlikely and, accordingly, that the pipeline design would be based on peak ground acceleration induced by an earthquake. For the marine section of the proposed Pipeline, the Geotechnical Summary Report indicates that local faults have been identified by seismic surveys and that, in some cases, it appears that seabed dislocations of up to a few metres have occurred. Many of the identified features correspond with offshore projections of known faults such as the San Juan Fault and the Gulf Islands Fault. Most of the approximately 22 identified potentially active faults lie within the Gulf Islands south of North and South Pender and Saturna Islands between KP 16.8 and KP 44. Seabed erosion is extensive, particularly over the eastern two thirds of the route, and has obscured the magnitude of fault dislocations.

Seismic criteria for the design of marine pipelines are not specified in OPR-99, the NEB Act or CSA Z662. GSX PL initially selected its seismic design parameters on the basis of earthquake ground motions with a 10 per cent in 50 year probability of exceedance,[10] as currently specified in the 1995 version of the National Building Code of Canada (NBCC). This roughly equates to the ground motions of an earthquake that would be expected to occur once in 475 years.

GSX PL stated that it adopted a performance goal of maintaining pressure containment and normal operability of the pipeline for a design condition represented by ground motions with a 10 per cent in 50 year probability of exceedance. GSX PL stated that, for a seismic event of this nature, it had complete confidence in meeting this goal, and that following a brief shutdown and inspection of the terrestrial and marine sections, the proposed Pipeline would resume operations.

The Panel asked GSX PL if its design would meet the anticipated requirements of the next edition of the NBCC,[11] in which design parameters would be based upon higher amplitude ground motions associated with a probability of exceedance of 2 per cent in 50 years. This event is approximately equivalent to an earthquake that would be expected to occur once in 2475 years. In response, GSX PL stated that it was confident the proposed design would maintain containment and pressure integrity for earthquake ground motions with a probability of exceedance of 2 per cent in 50 years.

---

[9] Soil liquefaction is a phenomenon in which the strength and stiffness of a soil is dramatically reduced when it is shaken by cyclic loads such as those that can occur during an earthquake, blasting or driving piles. Sandy soils that are loosely packed and saturated with water are most at risk. When subjected to cyclic loads, the soil particles can lose contact with each other and the soil turns into a heavy fluid with a very low strength. Pipelines must be designed to resist or avoid any forces resulting from liquefaction-related occurrences such as slope failures, large soil movements, soil spreading, soil settlement, floating of the pipe or loss of foundation support.

[10] The probability of exceedance, in this case, is that there is a 10 per cent probability that the design ground motions will occur or be exceeded within a 50 year time period.

[11] The next edition of the NBCC is expected to be released in 2005. In Canada, the evaluation of regional seismic hazard for the purposes of the NBCC is the responsibility of the Geological Survey of Canada (GSC). According to the GSC's website, new fourth generation seismic hazard maps were released by the GSC in Open File 4459 for public review in early 2003. The new hazard maps are based upon ground motions with a probability of exceedance of 2 per cent in 50 years. Once finalized and adopted, the GSC seismic hazard maps and earthquake loading guidelines will form the basis of the seismic provisions of the 2005 NBCC.

GSX PL included a megathrust event in its analysis and indicated that such an event would likely produce lower amplitude ground motions with a longer duration of shaking than local surface or crustal earthquakes. A megathrust event would be expected to produce the most severe design condition with respect to ground instability for this location.

GSX PL indicated that the proposed Pipeline has been designed for a 3 m fault displacement, either longitudinally, vertically or a combination of both.

GSX PL evaluated the potential for a tsunami. Three possible sources for the creation of a tsunami in the area around the Project were identified:

- megathrust earthquake off the west coast of Vancouver Island;
- a major underwater slide of recent sediments triggered either by an earthquake or by natural steepening of delta foreslopes at the mouth of the Fraser River; and
- fault rupture underneath the pipeline.

Computer models predicted very little water surge in the Strait of Georgia due to the megathrust earthquake scenario. A major slide of the Fraser Delta would generate a significant tsnunami that would reach the east side of the Gulf Islands and travel to the southeast down the Strait of Georgia. This would have little impact on the Vancouver Island end of the pipeline due to the protection provided by the islands located between the Strait of Georgia and the proposed Pipeline alignment. The landfall at Cherry Point in the US could experience the passing of a large wave that would result in some surficial erosion of the bluff. Fault rupture underneath the proposed Pipeline would generate a wave that would not exceed 1 to 2 m.

GSX PL indicated that pipelines located in deep water are not affected by surface waves such as tsunamis. The primary locations where a tsunami could affect the proposed Pipeline would be the shallow water areas of the landfalls in Canada and the US. The proposed Pipeline would be buried much deeper than the estimated erosion or scour depths at both shore crossings. GSX PL concluded that any impacts on the proposed Pipeline from a tsunami would be minimal for the selected pipeline route.

Some intervenors including Shadybrook Farm called for the proposed Pipeline to be designed to the highest standards available to ensure a safe and reliable design for such a highly active seismic area. Some intervenors expressed concern that there would be an insufficient or unreliable supply of energy to Vancouver Island if there was a marine pipeline break and that, as a consequence, there would be impacts on Vancouver Island residents and businesses.

Views of the Panel

The Panel notes that GSX PL's proposed approach to seismic design includes consideration of four scenarios to address the hazards presented by seismic events. Design criteria were selected for a megathrust earthquake scenario, a tsunami scenario, a fault displacement scenario and a scenario representing earthquake ground motions that would have a 10 per cent in 50 year probability of exceedance.

The Panel is of the view that GSX PL has taken an acceptable approach with respect to selection of criteria for the megathrust earthquake, tsunami and fault displacement design scenarios. However, the Panel was concerned with the selection of criteria for the earthquake ground motions scenario and examined GSX PL on two options for those criteria, based upon a 10 per cent in 50 year probability of exceedance and a more conservative 2 per cent in 50 year probability of exceedance.

Although GSX PL acknowledged that it had designed the proposed Pipeline to remain operable following a seismic event with a 10 percent in 50 year probability of exceedance, it provided expert statements that there was a high likelihood that the pipeline would maintain containment of pressure for a seismic event with a more conservative 2 percent in 50 year probability of exceedance. However, the Panel notes that the expert statements were based on professional judgment and that GSX PL did not provide an engineering analysis to demonstrate that the existing design would be able to meet the more conservative criteria.

The Panel notes the concern of intervenors with respect to public safety and the reliability of energy supply for Vancouver Island. In the Panel's view, it is important that key infrastructure such as the proposed Pipeline would remain serviceable, or sustain minimal damage so that it could quickly be returned to service, following an extremely rare seismic event.

The Panel is therefore of the view that the pipeline design should take into account a seismic event with a 2 percent in 50 year probability of exceedance to provide a higher level of safety and reliability of energy supply. Accordingly, the Panel will include a certificate condition to this effect. (Refer to Condition 29 in Appendix III of these Reasons.)

2.5 Geotechnical Matters

GSX PL filed a number of geotechnical investigations and surveys during the GH-4-2001 proceeding. These included geohazard identification and geotechnical assessments for the marine and terrestrial sections of the route to determine the geotechnical design parameters for the proposed Pipeline.

The major geohazards identified along the terrestrial section of the route relate to groundwater, slope instability and seismic shaking. The hazards that would affect the shore crossing include slope instability, stresses arising from liquefaction[12] and seismic shaking. For the marine section, the major hazards identified include seabed erosion potential, slope instability, and stresses arising from liquefaction and seismic ground motion.

---

[12] Refer to Footnote 9 on page 13.

GSX PL concluded from its preliminary geotechnical investigations for the terrestrial portion of the proposed Pipeline that the type and scale of geotechnical hazards would be addressed by conventional construction and operation measures. GSX PL did not have landowner permission to access much of the terrestrial route to conduct site-specific investigations prior to the oral hearing and committed to conducting further geotechnical field investigations prior to finalizing the design of the terrestrial section of the proposed Pipeline.

In response to a question from the Panel regarding the possible requirement for a geotechnical review of the JWA reports by an independent expert, GSX PL submitted that such a review was not warranted. GSX PL stated that, given the conservatism built into the design of the proposed Pipeline, it would take a substantial change in the geotechnical design parameters to alter the design.

With respect to the potential for liquefaction, the Panel questioned GSX PL on the methodology used by JWA. GSX PL confirmed that the analysis of liquefaction potential was based on a method presented in unpublished literature and, subsequently, provided a new analysis using an industry-accepted standard of practice that was recently published in the American Society of Civil Engineers (ASCE) Journal.[13] Additionally, GSX PL submitted the revised analyses of two Modified Cone Penetrometer Test plots at the hearing. This led to significant revisions in the liquefaction triggering analysis that had been presented in JWA's reports for the marine section of the proposed Pipeline.

The revised analysis predicted more extensive liquefaction to a greater depth than had previously been predicted. The revised analysis also included a review of the seismic survey records. Interpretation of the records indicated that denser soil or rock which would limit the depth of liquefaction would be present at depths of 15 m below seabed in some areas, and at depths of 30 - 40 m below the seabed in other areas.

In light of these findings, GSX PL increased the estimates for downslope movement of the proposed Pipeline from the previous range of 5.6 - 6.5 m to a range of 8.2 - 9.5 m. GSX PL stated that the pipe designers have assessed downslope movements of up to 19 m which is double the maximum revised downslope movement. GSX PL stated that the designers found that, for a range of pipe spans, pipe strains remained below the allowable limit for continued operation (2 per cent strain) and far below the levels that are deemed acceptable for pressure integrity (4 per cent strain).

Views of the Panel

The Panel is of the view that GSX PL has taken an acceptable approach to identifying and assessing the geotechnical hazards for the terrestrial section of the proposed Pipeline. The Panel notes that, following further site-specific geotechnical investigations as committed to by GSX PL, approval from the NEB would be required for any changes to the design, location, and construction of the proposed Pipeline. (Refer to Condition 1 in Appendix III of these Reasons.)

---

[13] The ASCE paper is titled *Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*. It appears in the *Journal of Geotechnical and Geoenvironmental Engineering* - October 2001- Volume 127, Issue 10, pages 817-833.

With respect to the marine section of the proposed Pipeline, the Panel notes that GSX PL has reassessed the pipeline for a design downslope pipe movement of 19 m. This is double the revised value for liquefaction-induced downslope pipe movement of 9.5 m. Using this more conservative approach, GSX PL found that pipe strains would remain within acceptable limits for the design seismic and pipe-span conditions.

In the Panel's view, GSX PL's approach appears to be reasonable; however, the Panel has not had the opportunity to examine the reassessment as GSX PL did not submit a revised Pipeline Seismic Analysis Report. Accordingly, the Panel is of the view that the Scope of Work for the verification of the marine section of the proposed Pipeline must provide for an assessment of the pipeline design for a revised downslope movement of 19 m for the applicable range of pipe spans. (Refer to Section 2.10 - Third Party Verification Process for the Marine Pipeline, and Condition 4 in Appendix III of these Reasons.)

2.6 Management System, Quality Assurance Program and Integrity Program

2.6.1 GSX PL Management System

GSX PL stated that it would ensure that its pipeline activities would be undertaken in conformance with all project specifications and regulatory requirements. It would achieve this by implementing a management system that would address quality control, management responsibility, training, process control, contractor and product control, document and data keeping, inspections, monitoring and preventive and corrective actions.

GSX PL indicated that GSX Operating Company, LLC (GSX OC) has been retained to engineer, procure, manage construction of and operate the Georgia Strait Crossing Project. GSX OC is an affiliate of Williams and has available to it all of Williams' policies, procedures, standards and ongoing support and knowledge. GSX PL maintained that Williams' track record of successfully designing, procuring, constructing and operating natural gas pipelines demonstrates the efficacy of its quality management and audit systems. An internal audit program would be implemented to verify that the proposed Pipeline is designed, constructed, operated, and abandoned in accordance with the procedures and standards that relate to safety and the protection of the environment.

GSX PL indicated in response to questioning by the Marine Coalition that it would adopt as many of Williams' policies, procedures and standards as possible, and adapt them as necessary to meet Canadian codes. GSX PL referred to its draft GSX Environmental Management System and Williams' new Environmental, Health and Safety (EHS) Policy and Management System Framework, which was submitted during the oral portion of the hearing. The new system has been under development since 2001, is scheduled for implementation in 2003 and is not expected to be fully functional until 2007.

The Marine Coalition expressed the opinion that GSX PL's level of knowledge with respect to basic safety management systems was questionable. It pointed out that GSX PL witnesses were unable to describe the basic elements of a safety management system, and they were unaware of formalized safety assessment and management tools. The Marine Coalition was of the opinion that GSX PL failed to provide sufficient information on how safety and pipeline integrity would be organized and managed throughout the project. The Marine Coalition submitted that GSX PL should prepare, and file with the NEB for approval, a comprehensive Safety Management Plan, Environmental Management Plan, Quality Management Plan, deviation and change control tracking systems, permit to work systems and a Pipeline Integrity Management Plan which would cover the entire project for all activities from concept to abandonment.

2.6.2 Quality Assurance Program

A quality assurance (QA) program is required under section 15 of OPR-99 to ensure that specifications for pipe and components are met. GSX PL stated that it would implement a quality management system (QMS), including a QA program, to ensure that all pipeline activities would comply with regulatory requirements and conform to project specifications. For line pipe and major components, GSX PL stated that it would only purchase from manufacturers that it had qualified. As part of the QMS, GSX PL's representatives would monitor and inspect different aspects of the manufacturing process, audit the manufacturers' quality assurance and control programs, and review the final documentation package for compliance with specified requirements before acceptance.

2.6.3 Pipeline Integrity Management Program

GSX PL stated that it would develop a pipeline integrity management program based on the results of the risk assessment it had conducted. As required in section 40 of OPR-99, this program would identify, assess, monitor, and mitigate all relevant hazards to the proposed Pipeline system. The program would also include a risk-based methodology for determining the type and frequency of in-line inspection that would be used to monitor integrity-related threats, including external and internal corrosion.

> ***Views of the Panel***
>
> The Panel notes that GSX PL would rely upon Williams for the design, procurement, construction and operation of the proposed Pipeline. Williams is an established company whose existing management systems have demonstrated conformance with general management systems principles. The Panel notes further that Williams has identified areas for improvement with respect to its current systems and has embarked on implementing those changes through its new Environmental, Health and Safety Policy and Management System Framework.

With respect to the terrestrial section of the proposed Pipeline, the Panel is of the view that Williams' safety performance record, its proposed management systems, and the regulatory compliance programs conducted by the NEB will be sufficient to ensure that the design and construction phases will be adequately managed.

Prior to the commencement of construction of the marine section of the proposed Pipeline, the GSX PL management systems will be subjected to examination through a rigorous independent third party verification process. (Refer to Section 2.10 - Third Party Verification Process for the Marine Pipeline, and Condition 4 in Appendix III of these Reasons.) The Panel is of the view that the proposed management systems, as augmented by the third party verification process, will be sufficient to ensure that the design and construction phases of the marine section of the proposed Pipeline will be adequately managed.

With respect to the requests of the Marine Coalition for the filing for NEB approval of a Safety Management Plan, an Environmental Management Plan and other plans and systems, the Panel notes that the NEB does not routinely require that this information be filed for approval. The Panel notes that GSX PL would be subject to the provisions of OPR-99, which establish the requirements and obligations that a company must meet prior to the commencement of construction or operation. Sections 53, 54 and 55 of OPR-99 require a company to conduct audits and inspections of its programs and systems to ensure that the pipeline is designed, constructed and operated safely and in compliance with regulatory requirements and conditions. The NEB routinely conducts audits and inspections of pipeline projects to verify regulatory compliance. These regulatory activities continue throughout the life of the project.

As part of its audit and inspection process, the NEB examines extensive documentation including the documents and information referred to by the Marine Coalition. The scope of the NEB audits and inspections for the Project would include activities that examine the status, performance and effectiveness of GSX PL's management system implementation, including the progress made in implementing Williams' new EHS management system, during the pre-construction and construction phases. The Panel is of the view that these activities would provide the necessary regulatory oversight in this case and, accordingly, will not require the filing of these programs.

GSX PL must also satisfy the requirements of OPR-99 and the NEB to establish an adequate management system for the operational phase of the Project. During the operational phase, the NEB also conducts periodic audits to evaluate the efficacy of company management systems and compliance with OPR-99. The Panel is of the view that the provisions of OPR-99 and the audit programs of the NEB are sufficient to ensure that

GSX PL's management systems would be acceptable for the operational phase of the Project.

The Panel notes that details of integrity management programs are typically not available until after a pipeline system becomes operational. The general proposal for GSX PL's quality assurance program and GSX PL's general proposal with respect to integrity management are both acceptable to the Panel.

2.7 Horizontal Directional Drill

GSX PL submitted that the HDD at the Manley Creek shore crossing would be accomplished in three stages:

- drilling a pilot hole along the designed drill path;
- reaming in multiple passes to enlarge the pilot hole to allow the 406.4 mm outside diameter pipe to be pulled through; and
- pulling the natural gas pipeline segment through the drilled and reamed hole.

GSX PL submitted that pipeline stress encountered during pull-back would be a function of the drill path length and curvature, and the ability of the drilled hole to resist collapse. GSX PL also stated that the soil horizon is well suited to directional drilling and that hole-collapse following reaming is not anticipated. All stresses on the HDD pipe section are anticipated to be far below the allowable stress limits. GSX PL stated that, in the event of severe pipe damage or collapse during the HDD, it could require as little as a single day to extract and replace a damaged pipeline portion, or up to two months if it had to abandon the initial crossing and drill and install a second crossing.

Views of the Panel

The Panel is of the view that GSX PL has demonstrated the feasibility and appropriateness of the HDD design. Although it is unlikely that the HDD would be unsuccessful, the Panel will include a certificate condition requiring GSX PL to have a detailed site-specific plan in place, and have that plan approved by the NEB, prior to proceeding with the open cut alternative for the shore crossing. (Refer to Condition 27 in Appendix III of these Reasons.) The HDD is discussed in further detail in Section 4.2.2 - Partial or Full Open Cut, of the JRP Report.

2.8 Blasting

The effects of blasting on groundwater quality are covered in the JRP Report in Section 5.1.4 - Effects of Blasting on Water Resources. The effects of blasting on structures are discussed in Section 5.3 - Physiography and Soils of the JRP Report.

GSX PL submitted that shallow bedrock within 2 m of ground surface would be encountered over approximately 15 per cent of the terrestrial route. To ensure a sufficient burial depth at these locations, the rock would be ripped and in some cases blasted.

GSX PL stated that blasting could cause fly rock. GSX PL also stated that, in the absence of adequate pipe padding, blast rock would have the potential to damage the pipe coating where used as backfill. To minimize the amount of blasting, GSX PL committed to ripping bedrock wherever feasible and to reducing the trench depth in shallow bedrock areas, while still maintaining the minimum 0.6 m depth of cover required to ensure pipeline integrity.

With respect to its blasting practice, GSX PL stated:

- blasting would be undertaken by licensed blasters in accordance with professional practice;
- warning sirens would be used prior to blasting;
- the area would be fully monitored to ensure there would be no risk to humans or large mammals (including livestock) in the vicinity;
- blasting mats would be used where inhabited structures are within 50 m of blasting to control fly rock;
- blasting controls, such as limits on individual blasts, use of delays and buffer blasting, would be implemented within 50 m of any structures that could sustain damage from ground vibration;
- where blasting occurs within 20 m of inhabited structures, ground vibrations during blasting would be monitored; and
- excess blast rock and excavated rock would be disposed of in consultation with the landowner and the municipality.

GSX PL also stated that it would conduct a pre-construction assessment on inhabited structures within 50 m of blasting activity.

Views of the Panel

The Panel is of the view that, subject to a requirement for pre-construction and post-construction water well monitoring and analysis, structural assessment and relevant corrective action, GSX PL has adequately demonstrated the feasibility and appropriateness of its proposed blasting practice. (Refer to Conditions 21 and 22 in Appendix III of these Reasons.)

2.9 Operation

GSX PL stated that prior to the commencement of operation it would finalize a contractual agreement with Centra for the maintenance of the terrestrial portion of the proposed Pipeline. In addition, GSX PL would finalize the Operations and Maintenance Manuals to be used and would submit them to the NEB for review.

2.9.1 Control, Monitoring, and Leak Detection

GSX PL stated that the proposed Pipeline would be remotely monitored and controlled by operators in Williams' main control centre located in Salt Lake City, Utah using a SCADA system and remote telemetry. A separate back-up centre would allow the operators to take over pipeline monitoring and control from the main control centre, if required, without a loss of data. In the event of a communications failure between the control centre and the instrumentation on the pipeline facilities, failsafe systems would protect equipment from undesirable conditions such as an overpressure situation.

During the hearing, some intervenors including the Marine Coalition and Mr. Campbell asked questions regarding the location of the control centre, the time to respond to a leak or rupture, the requirement for certification of the control centre and security access to the control centre. In response, GSX PL stated that an alarm system, programmed to activate, for example, when a system imbalance or equipment failure occurs, would provide audio or visual notification to control centre operators. In addition, GSX PL stated that competent controllers, qualified to US regulations, would monitor pipeline conditions, issue commands and analyse any system alarms. GSX PL stated that, while certain devices and portions of its pipeline control system are certified, it was not aware of any requirements to certify the actual control centre.

In addition to regular pipeline patrols over the terrestrial section of the proposed Pipeline, GSX PL stated that it would implement a leak detection system for monitoring any sizeable leaks that may occur, especially on the marine portion. This leak detection system would be based on parameters monitored by the SCADA system. GSX PL stated that a preliminary design study indicated that the system is capable of detecting leaks of 1 to 3 MMcf/d within a 3 hour timeframe, at maximum flowrate and pressure, in the marine section of the proposed Pipeline.

2.9.2 Emergency Preparedness and Response

GSX PL stated that its emergency preparedness and response (EPR) program would fulfill the requirements of the NEB, the US Occupational Safety and Health Act, the US Environmental Protection Agency, and the US Department of Transportation. GSX PL also stated that the program would meet the requirements set out in the NEB's 24 April 2002 Memorandum of Guidance regarding Security and Emergency Preparedness and Response Programs.[14]

With specific reference to the EPR program elements as outlined in the 24 April 2002 Memorandum of Guidance, GSX PL stated it would include the following components in its EPR program:

- EPR Program Development (Hazard Assessment);
- Emergency Procedures Manual;
- Liaison Program (First Responders);
- Continuing Public Education Program;
- Emergency Response Training;

---

[14] All company letter, NEB file no. 172-A000-73

- Emergency Response Exercises;
- Incident and Response Evaluation; and
- Emergency Response Equipment

> ***Views of the Panel***
>
> The Panel is satisfied with GSX PL's proposed method of controlling and monitoring the proposed Pipeline system and notes that many large pipeline systems are successfully monitored and controlled by remote telemetry. The Panel further notes that an assessment of the adequacy and effectiveness of the SCADA system, including the leak detection system, would be included in the scope of future NEB audits.
>
> The Panel is of the view that GSX PL has provided a satisfactory outline of its proposed EPR program. GSX PL will be required to submit:
>
> - its EPR program prior to operation in accordance with the requirements of Section 32(2) of the NEB's OPR-99; and
> - its construction safety manual prior to construction in accordance with the requirements of Section 20(1) of the NEB's OPR-99.

2.10 Third-Party Verification Process for the Marine Pipeline

GSX PL indicated in its risk assessments that the likelihood of a break of the marine section of the proposed Pipeline was remote and that risks to public safety and the environment would not be significant if the pipeline were properly designed, built and operated. (Refer to Section 2.3 - Risk Assessment, of these Reasons.) However, the risk assessments did not specifically consider the possibility of impacts to the economy of Vancouver Island in the event of an extended outage of the marine section of the proposed Pipeline. GSX PL confirmed that serious damage or rupture of the marine section of the proposed Pipeline could result in an extended repair time ranging from weeks to months, at a cost for repair of approximately CDN $750,000 to $3 million, and that gas transportation service would not be available through the proposed Pipeline for that period.

A number of intervenors expressed concern that a marine pipeline break and subsequent lengthy repair period could result in insufficient or unreliable energy supplies for residents and businesses on Vancouver Island. This concern would likely increase if the proposed Pipeline was relied upon to fuel additional gas-fired generation plants on Vancouver Island in the future.

GSX PL was asked through IRs to comment on whether enhanced scrutiny by an independent third party, such as by a certification or verification process, was warranted to ensure the integrity and reliability of the marine section of the proposed Pipeline. GSX PL submitted that certification or verification was not necessary because it would accomplish all integrity and reliability goals through the use of:

- Canadian and US standards, codes and regulations;
- Williams' proprietary design standards, specifications and procedures;
- external consultants and independent expert reviews;
- Williams' quality management systems and quality control programs; and
- risk assessment studies.

GSX PL pointed out that BC Hydro had engaged Kellogg, Brown and Root (KBR) as an independent engineer to review all aspects of the Project and to conduct a third party independent review as part of its due diligence process. The Scope of Work for the KBR review was primarily focused on the design and procurement phases of the Project for management of business risks including cost control measures, contracting strategies, schedule control issues, regulatory risks and logistics risks. The work included quarterly reviews by KBR and the review of specifications prior to the purchase of any major equipment. GSX PL stated that it has comprehensively addressed the concerns of the public with regard to safety and reliability and that no significant concern about safety or reliability remains. GSX PL submitted that given these measures an independent certification or verification process was not warranted.

Views of the Panel

The Panel posed numerous and detailed IRs to GSX PL in the areas of engineering, safety, seismic and geotechnical matters, and management systems. The Panel questioned details of studies and underlying assumptions that related to key components of the pipeline materials, design and construction. There are several reasons for the Panel's rigorous scrutiny of the design of the proposed Pipeline. First, there is a strong public concern regarding the environmental effects, safety and reliability of this pipeline, as evident in many of the issues raised by intervenors and the letters of comment received by the Panel. Second, there are very few marine pipelines in Canadian waters. An undertaking by a company to follow CSA Z662 and OPR-99 for a terrestrial pipeline is ordinarily an indication that the pipeline would be designed, constructed and operated to acceptable standards. However, there are currently no explicit regulatory requirements for marine pipelines under NEB jurisdiction. Third, the proposed Pipeline would be constructed in an area of high seismic activity. The proposed Pipeline could be subjected to large strain conditions which, in the Panel's view, warrants a thorough examination of seismic and geotechnical information and design criteria along the proposed route. (Refer to Section 2.4 - Seismic Analysis and Criteria, and Section 2.5 - Geotechnical Matters, of these Reasons.)

The Panel is also concerned that the marine section of the proposed Pipeline might not be repaired easily or quickly in the event of a failure. Terrestrial pipelines are ordinarily accessible and any repairs or replacements of pipe or components can typically be completed within a matter of days, resulting in little if any impact on pipeline operations. By way of contrast, the evidence indicated that a failure in the marine section of the proposed Pipeline could take months to repair. As the eventual primary source of gas for two electrical generation facilities on Vancouver Island, the proposed Pipeline would take on an important role in the overall energy supply on the Island. The economic and social implications of an extended interruption in service to Vancouver Island could be significant.

In light of these concerns, the Panel is of the view that the design, construction, testing and operation of the proposed Pipeline must be independantly scrutinized to minimize, to the extent possible, any potential sources of pipe failure. An independent third party verification of the design, construction and testing of the marine section of the proposed Pipeline is warranted due to the location of the pipeline in an area of significant seismic activity, the lack of national standards for the seismic design of pipelines, the importance of a secure gas supply to Vancouver Island, and the possibility of an extended repair time in the event of a rupture of the marine section of the proposed Pipeline. The use of a rigorous independent verification process is intended to identify and correct any potential sources of failure before they would be incorporated into the design, construction and operation of the proposed Pipeline.

The Panel notes that GSX PL retained KBR to review the design of the proposed Pipeline. The evidence submitted by GSX PL indicates that the scope of KBR's review was primarily focused on financial matters, such as cost control, and did not sufficiently address the reliability and integrity of the marine section of the proposed Pipeline. The Panel is therefore of the view that the review by KBR is not a substitute for rigorous independent third party verification.

Accordingly, the Panel will require an independent third party verification of the marine section of the proposed Pipeline. (Refer to Condition 4 in Appendix III of these Reasons.)

Chapter 3

Environment, Socio-Economic, Consultation, Routing and Land Matters

3.1 Environment

3.1.1 Joint Review Panel Report

The Panel considered the potential environmental effects of the Project as required under the CEA Act, and discussed these in the JRP Report released on 30 July 2003. The JRP Report reflects the Panel's review of the environmental effects of the Project and mitigation measures based on the project description, factors to be considered during the review and the scope of the factors. The Panel has made a number of recommendations throughout the JRP Report to ensure that appropriate mitigation and follow-up would be implemented.

Provided that all of the Panel's recommendations and the environmental commitments made by GSX PL in its application and in undertakings during the GH-4-2001 proceeding are implemented, the Panel concluded that the Project is not likely to cause significant adverse environmental effects. Therefore, the Panel recommended that the Project be allowed to proceed to regulatory decision-making as long as the recommendations in the JRP Report were made part of the requirements of any approval by the NEB. (Refer to Section 3.1.3 of these Reasons for a discussion of the government response to the JRP Report.)

In addition to the potential environmental effects considered in the JRP Report, the Panel considered the environmental effects of the combustion of gas at the new generation facility proposed for Duke Point under the NEB Act. (Refer to Section 3.1.2 below.) Socio-economic, consultation, routing and land matters outside the scope of the CEA Act, but within the scope of the NEB Act, were also considered by the Panel and are discussed in these Reasons. (Refer to Sections 3.2 to 3.4 below.)

3.1.2 Environmental Effects of Combustion of Gas at VIGP

The proposed VIGP, to be located at Duke Point near Nanaimo, BC, would have a nominal power output of 265 MW without duct firing and 295 MW with duct firing. Information on the proposed VIGP, filed by GSX PL in the GH-4-2001 proceeding on 18 June 2002, was excerpted from the "Application for a Project Approval Certificate" provided by Vancouver Island Energy Corporation (VIEC) to the British Columbia Environmental Assessment Office (BC EAO) on 17 June 2002.

For the assessment of environmental effects, an emission inventory for the local airshed was prepared that modelled present emissions and the incremental contribution from VIGP.

The environmental assessment included:

- a review of emission control technologies and emission levels (best available technology review);
- a comparison of proposed emission levels to federal and provincial air quality objectives and standards; and
- modelling of air quality impacts (e.g., use of CALMET and CALPUFF models) and management of greenhouse gas (GHG) emissions.

VIEC's public health impact assessment of risks to human health potentially associated with operation of the proposed VIGP focused on chemical pollutants that could be emitted or released. Modelling allowed the estimation of both short-term and long-term average ambient air concentrations for use in risk assessment, accounting for site-specific terrain and meteorological conditions. Human health risks potentially associated with exposure to non-carcinogenic air pollutants were estimated and compared with reference exposure levels for non-cancer health effects. Health risks associated with exposure to potentially carcinogenic air pollutants were characterized in terms of excess lifetime cancer risks. The annual health impacts of the emissions of non-criteria and criteria air pollutants from VIGP, including particulate matter, were estimated using measured baseline ambient air concentrations and the predicted maximum concentration increase in urban and rural populated areas under different worst-case scenarios and measured meteorological conditions.

Local and Regional Air Quality

VIEC's air quality assessment addressed impacts of emissions from VIGP on the air quality of the regional airshed. The predicted impact of VIGP alone was calculated and pollutant concentrations tabulated. VIEC's modelling, used to predict the dispersion and concentrations of pollutants from VIGP, shows that emissions are small and well below the strictest air quality objectives, standards or reference levels. These data and subsequent references to data in this section are summarized in Table 3-1.

VIEC's assessment states that the Harmac pulp and paper mill, adjacent to the proposed VIGP location, is a significant source of emissions in the region. The impact of the Harmac Mill was assessed and pollutant concentrations were predicted for both maximum ground level conditions and the 98th percentile. The predicted emissions concentrations from the Harmac Mill alone exceed the PM_{10} (24-hour), $PM_{2.5}$ (24-hour)[15] and the (SO_2) (1-hour) criteria in the area close to the Harmac Mill near the Harmac dock. However, the predicted combined impact of the dispersion of emissions from VIGP together with the Harmac Mill shows that the maximum concentrations of these pollutants did not change with the addition of VIGP emissions. This implies that the Harmac emissions dominate and overshadow the minimal contributions from VIGP. Therefore, the incremental impact of VIGP on the Nanaimo airshed is expected to be negligible. VIEC further submitted that VIGP would have no measurable impact on the air quality of the southern portion of the Strait of Georgia and, in particular, the Lower Fraser Valley airshed.

---

[15] PM_{10} and $PM_{2.5}$ refer to particulate matter less than 10 microns and 2.5 microns in diameter respectively.

Table 3-1
Predicted Emissions Concentrations from the Harmac Mill and VIGP Together for the Combined 1995 and 2000-2001 Modelling Period[16]

Pollutant	Averaging Period	Predicted Concentration ($\mu g/m^3$)				Strictest Ambient Objective ($\mu g/m^3$)
		Harmac Mill Plus VIGP		VIGP Alone	Harmac Alone	
		Maximum	98th Percentile[17]	Maximum	Maximum	
NO_2	1-hour	123.2	27.6	32.1	123.2	400[18]
	24-hour	31.1	16.0	12.7	31.1	200[18]
	Annual	3.1		0.8	3.1	60[18]
PM_{10}	24-hour	58.6	37.3	1.1	58.6	50[19]
	Annual	8.6		0.07	8.6	N/A
$PM_{2.5}$	24-hour	52.2	33.0	1.1	52.2	30 (98th percentile)[20]
	Annual	7.5		0.07	7.5	N/A
SO_2	1-hour	515.5	158.8	3.4	515.5	450[18]
	24-hour	136.9	116.7	1.4	136.9	150[18]
	Annual	24.8		0.09	24.8	25[19]
CO	1-hour	753.0	178.2	68.2	753.0	14 300[19]
	8-hour	201.8	156.9	31	201.8	5 500[19]
	Annual	28.5			28.4	N/A
VOC	1-hour	44.6	11.4	5.2	44.6	N/A
	24-hour	10.7	8.9	2.1	10.7	N/A
	Annual	1.8		0.1	1.8	N/A

---

[16] VIGP is assumed to be operating at 295 MW power output with duct firing.

[17] The Canadian Council of Ministers for the Environment, in its 2000 *Canada-Wide Standards for Particulate Matter and Ozone*, states that achievement of the standard for the 24 hour average ground level concentration of particulate matter is to be based on the 98th percentile ambient measurement annually, averaged over three consecutive years. For compliance, 98 per cent of the particulate matter measurements would either meet or be below the standard.

[18] CCME (1999) National Ambient Air Quality Objectives

[19] BC WLAP (1995) Ambient Air Quality Objective/Guideline

[20] The Canada Wide Standard for $PM_{2.5}$ (2000)

Two monitoring stations located in Nanaimo and Cedar, 8 km and 2.4 km respectively from the VIGP site, would be used to continue to provide additional information on baseline air quality in the Nanaimo airshed. Ambient monitoring would be carried out in accordance with protocols established by the BC Ministry of Water, Land and Air Protection (BC WLAP). A continuous stack emission monitoring system would be installed and operated to monitor concentrations of nitrogen oxides, carbon monoxide, ammonia and oxygen in the gases discharged from the stack. All monitoring data would be measured and reported according to BC WLAP requirements.

The Society Promoting Environmental Conservation and the David Suzuki Foundation (SPEC/DSF) retained SENES Consultants Limited to provide a peer review of the air quality dispersion analysis for VIGP based on GSX PL's 18 June 2002 filing and submitted it to the Panel. SPEC/DSF concurred with the overall conceptual approach adopted by VIEC, but identified what it considered to be several deficiencies in the analysis. These deficiencies related to: meteorological data; start-up; partial load and upset conditions; pollutant emissions; the health risk assessment; cumulative impacts of PM_{10}; and collateral environmental impacts. In its revised written evidence, SPEC/DSF submitted that GSX PL had responded to the identified concerns with the exception of calculating and modelling Harmac's emissions and the related issue of cumulative effects. Permitting VIGP in an area where certain air quality parameters such as $PM_{2.5}$, PM_{10} and SO_2 exceed the air quality objectives continued to be questioned by SPEC/DSF.

GSX PL submitted that it had addressed these concerns and provided information to show that VIGP would have no significant cumulative air quality impacts. GSX PL submitted that the question of issuing a permit for VIGP in the same airshed as the Harmac Mill would be decided by the BC EAO.

VIGP would be located within the core territory of the Snuneymuxw First Nation. The Snuneymuxw First Nation raised concerns with the potential health and environmental impacts of VIGP on its First Nation members, including a lack of confidence in the air quality modelling and the addition of further $PM_{2.5}$ to an airshed that it considered to be compromised. The Snuneymuxw First Nation also indicated that it was participating in the provincial environmental assessment process to resolve its issues.

The VIEC submission discussed air quality issues identified by the Snuneymuxw First Nation and its proposed mitigative measures to address the concerns. VIEC committed to working to address other project-related issues and concerns raised by the Snuneymuxw First Nation during the BC EAO Application review.

Environment Canada indicated that the information provided in the application for the VIGP facility supported VIEC's conclusions. Environment Canada concluded that the proposed VIGP would not cause any Canadian maximum acceptable air quality objectives or applicable standards to be exceeded. In relation to $PM_{2.5}$ and PM_{10}, Environment Canada submitted that the Canadian Council of Ministers of the Environment (CCME) adopted the *Canada Wide Standard for Particulate Matter and Ozone* in June 2000, but details are still under development.

Based on its detailed analysis, VIEC's assessment indicates that the estimated incremental public health impact of VIGP would not be significant.

Greenhouse Gas Emissions

VIEC's approach with respect to GHG emissions and management was based on guidance received from BC WLAP during consultation activities. VIEC's assessment:

- quantifies GHG emissions associated with VIGP;
- describes design and operational aspects of VIGP that would help minimize GHG emissions;
- describes BC Hydro's commitment to prepare a GHG management plan in consultation with BC WLAP, prior to the start-up of VIGP, and the anticipated approach for this plan; and
- identifies anticipated potential opportunities and approaches that would be considered to offset a substantial amount of the additional GHG emissions from VIGP.

To quantify annual GHG emissions, it was conservatively assumed that VIGP would operate 365 days per year (8760 hours per year) at 100 per cent load. The combined emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) were reported in terms of their combined equivalent global warming potential, quantified as tonnes of CO_2 equivalent emissions.

GSX PL submitted that BC Hydro has developed and implemented a GHG management strategy since 1994, one component of which is GHG emission offsets. BC Hydro considers a GHG emission offset to be a project that compensates for GHG emissions at one source by reducing, avoiding, or capturing and storing emissions at another source.

GSX PL provided both written and oral evidence regarding BC Hydro's GHG Management strategy. As part of its strategy, BC Hydro committed to offset 50 per cent of the increase in GHG emissions in the period through 2010, from both the ICP (where BC Hydro is the power purchaser) and VIGP (where BC Hydro is the owner/operator). A BC Hydro employee who appeared as a witness for GSX PL stated:

> *The plant at Campbell River is a so-called "cogeneration facility", which means it simultaneously produces electricity and steam. It was situated . . . . on the premises of an existing pulp and forest products mill that uses steam in its process. That mill had been using natural gas and other fuels to produce steam for its own needs and (ICP) is now providing steam to the mill, which in effect displaces the fuel that they were using previously to produce steam.*
>
> *So when we established the commitment, we committed to offsetting the increase in emissions at the two plants. In the case of VIGP, it's a stand-alone plant . . . . 50 per cent of the increase is equal to 50 per cent of the total. In the case of ICP, because there were those historic steam-related greenhouse gas emissions, we have committed to offset 50 per cent of the increase above that historic level.*[21]

---

[21] GH-4-2001 Hearing Transcripts, 4 March 2003, Volume 7, paragraphs 13260, 13261

For VIGP, a 50 per cent offset in GHG would equate to a range of 350 000 to 400 000 tonnes of CO_2 equivalent per year as a broad estimate. For ICP, this would equate to approximately 300 000 tonnes of CO_2 equivalent per year. BC Hydro employees produced as witnesses for GSX PL indicated that the selection of a 50 per cent target balanced the competing objectives of minimizing environmental impacts and maintaining competitive electricity rates. BC Hydro submitted that because its GHG offset commitment is voluntary, the 50 per cent target should be considered environmentally progressive and economically prudent, particularly in light of the federal government's implementation plan of November 2002 for the Kyoto Protocol to the United Nations Framework on Climate Change, which calls for an average 15 per cent offset requirement among large industrial emitters, including electric utilities, during the 2008-2012 period.

Evidence provided by GSX PL on BC Hydro's GHG management strategy stated that, at a minimum, the offsets must meet the current provincial and national criteria of being real, measurable, verifiable and surplus to any regulatory requirements, including other specified criteria.[22] The offsets would be accomplished through GHG emission reduction projects at other sites, with assistance from BC Hydro. Progress in achieving the GHG offset commitment would be reported through BC Hydro's regular public communication channels so that the commitment could be tracked openly. Further, a BC Hydro witness for GSX PL noted that BC Hydro has been an active participant in the Voluntary Challenge and Repository Inc. since 1994 and in that time has submitted seven annual reports detailing its GHG emissions and GHG management efforts. Due to Canada's ratification of the Kyoto Protocol, BC Hydro is re-evaluating its GHG management strategy. Beyond 2010, BC Hydro indicated that it has not determined its intentions, but recognized that the implementation of the Kyoto Protocol would be well under way by that date.

As discussed in the JRP Report, SPEC/DSF provided written evidence related to the effects of GHG and global climate change that referred to the Intergovernmental Panel on Climate Change and Canada's ratification of the Kyoto Protocol. SPEC/DSF submitted that the total potential for GHG production from the gas supplied by the proposed Pipeline would be as much as 1.8 million tonnes of GHG per year, which would approximately double BC Hydro's GHG emissions, based on its 2001 estimate of 1.9 million tonnes per year. SPEC/DSF urged the Panel to require GHG emission mitigation and follow-up programs and concluded that BC Hydro's offset plan should be expanded to include 100 per cent of the emissions, as an enforceable condition of an approval of the Project.

BC Department of Energy and Mines and the Alberta Department of Energy did not support these recommendations. The BC Department of Energy and Mines submitted that BC Hydro has committed to offset 50 per cent of the increase in GHG emissions at VIGP through the year 2010, which is more than three times the goal set for large industrial emitters in the federal government's Kyoto Protocol implementation plan of November 2002. Moreover, this commitment was made despite the absence of any regulations or national standards. Furthermore, implementation of the Kyoto Protocol will require consultation between the federal and provincial governments in recognition of the industrial, economic and cultural structures of Canada.

---

[22] BC Hydro's GHG offset criteria provided in response to SPEC/DSF IR 2.3(g)

In relation to GHG, Environment Canada indicated that Parliament ratified the Kyoto Protocol on 17 December 2002, and is now moving from a planning phase to one of implementing the Climate Change Plan to achieve the national GHG reduction targets.

Environment Canada stated:

> *The Climate Change Plan for Canada aims to achieve our national GHG reduction target of 6 per cent below 1990 levels, or 240 MT.*[23] *This target takes into account projections that incorporate reasonably large increases in both natural gas consumption and electricity consumption in BC. Most of the latter is projected to come from gas-fired generation. Consequently, emissions resulting from new natural gas pipeline and energy generation projects have been factored into the outlook. Because such developments have been incorporated in the outlook, the GSX project should not compromise Canada's ability to reach our Kyoto target.*[24]

Environment Canada also submitted that the reporting of GHG through either the National Pollutant Release Inventory or some other mechanism will begin in 2004. The mechanism is to be mandatory, verifiable and contain suitable provisions for facility-level reporting. The Government of Canada will be consulting stakeholders on the reporting mechanism within the context of discussion on climate change.

Views of the Panel

In relation to local and regional air quality, the Panel notes that VIGP on its own is not predicted to exceed any Canadian maximum acceptable air quality objectives or standards. Evidence demonstrates that some parameters such as the 24-hour PM_{10} objective, 24-hour $PM_{2.5}$ objective and 1-hour SO_2 objective within VIGP's study area would be exceeded as a result of the Harmac Mill and are predicted to occur very infrequently within less than 1 km of the Harmac Mill. The air quality assessment shows that VIGP would result in a near-zero incremental increase in maximum 24-hour PM_{10} and $PM_{2.5}$ concentrations at locations where the Harmac Mill's emissions exceed the criteria.

Regarding GHG, the Panel considers climate change an important Canadian and global issue and recognizes the Government of Canada's effort in this regard by the ratification of the Kyoto Protocol and the development of the Climate Change Plan for Canada.

Consideration of GHG emissions associated with a proposed project allows applicants, the public and governments to evaluate proposals and actions in the context of existing and developing policies and plans for managing GHG emissions (i.e., the Climate Change Plan for Canada). In the context of VIGP, the Panel relies on Environment Canada's statement that GHG emissions resulting from new natural gas pipeline projects and energy generation projects, such as the proposed Pipeline and VIGP, have been factored into the Government of Canada's outlook, and therefore should not compromise Canada's ability to reach its Kyoto Protocol target.

---

[23] Megatonnes

[24] Environment Canada letter to the Panel dated 25 February 2003, page 5

The Panel notes that, at the present time, there are no defined criteria to measure significance in relation to GHG when considered in an environmental assessment. However, comparisons to provincial or national emissions levels can provide a useful context for evaluating projects. The Panel concludes that in comparison to SPEC/DSF's GHG totals of 65.9 MT and 726 MT of CO_2 equivalent in 2000 for BC and Canada respectively, emissions from VIGP, if assumed to be 800 000 tonnes of CO_2 equivalent per year, would represent approximately a 1.2 per cent increase and a 0.1 per cent increase respectively. The Panel also notes SPEC/DSF's concern that BC Hydro's annual GHG emissions could approximately double as a result of the combustion of gas at VIGP and ICP.

Views of the Majority of the Panel

The majority of the Panel notes BC Hydro's commitment to offset 50 per cent of the increase in GHG emissions from both the ICP and VIGP in the period through 2010. This commitment was set out in written evidence filed by GSX PL as well as in oral testimony from a BC Hydro witness for GSX PL. Given that this is a voluntary commitment, and that there are no legally binding federal or provincial regulations or targets for GHG, the majority of the Panel has relied upon this commitment and considers this to be a positive step toward addressing GHG emissions from ICP and VIGP.

During the oral hearing, the Panel inquired whether BC Hydro intended to offset 100 per cent of the emissions from VIGP in light of the Government of Canada's ratification of the Kyoto Protocol. A GSX PL witness from BC Hydro replied that it would not offset 100 per cent of the emissions unless required to do so by legislation, since it viewed a 50 per cent offset target as environmentally progressive and economically prudent. The majority of the Panel notes that the witness from BC Hydro testified that BC Hydro was re-evaluating its GHG strategy in light of the Kyoto Protocol.

The majority of the Panel accepts BC Hydro's commitment to offset 50 per cent of the increase in GHG emissions from both ICP and VIGP in the period through 2010. Beyond 2010, in consideration of best management practices and the regulatory requirements at that time, the majority of the Panel expects that BC Hydro would, at a minimum, continue to offset 50 per cent of the emissions throughout the life of ICP and VIGP. The majority of the Panel also encourages BC Hydro to consider options for offsetting 100 per cent of the emissions on the basis that it is a government-owned Crown corporation and, as such, has a responsibility to the public to be a leader with respect to national and international agreements such as the Kyoto Protocol. The majority of the Panel strongly encourages BC Hydro to purchase offsets that would be eligible for credit under Canada's effort to meet its Kyoto Protocol target. Although the majority of the Panel recognizes that all details have not been finalized, BC Hydro should consider its criteria, identified during the hearing, that offsets be measurable, verifiable, and meet other current provincial and national criteria.

At the oral hearing, BC Hydro witnesses for GSX PL stated that progress on this commitment would be reported through BC Hydro's regular public communications channels. Given the level of public concern on this issue, the majority of the Panel considers that BC Hydro's commitment to offset emissions from VIGP and ICP should be tracked through a certificate condition that would be imposed on GSX PL.

The majority of the Panel is of the view that GSX PL should file an annual report with the Board and Environment Canada starting in the year following commissioning of VIGP and through the end of 2010 describing the offsetting of emissions from ICP and VIGP. Accordingly, a certificate condition to this effect will be included. (Refer to Condition 30 in Appendix III of these Reasons.)

The majority of the Panel is of the view that the combustion of the gas at VIGP is not likely to result in significant adverse effects to local or regional air quality or public health. In light of the comments made by Environment Canada regarding Canada's ability to reach its Kyoto Protocol target, and BC Hydro's statement that it has committed to offset emissions from ICP and VIGP, the majority of the Panel concludes that issues related to GHG emissions have been satisfactorily addressed.

Views of Member Harrison

I agree with the majority conclusion that the combustion of the gas at VIGP is not likely to result in significant adverse effects to local or regional air quality or public health.

With respect to GHG emissions, I note the statement of Environment Canada that the increase in emissions that would result from both the ICP and VIGP has been factored into the Government of Canada's outlook and should not compromise Canada's ability to reach its Kyoto target. As a result, I do not need to consider the voluntary commitment made by BC Hydro in relation to GHG emission offsets. Therefore, I do not agree with the majority's decision imposing a certificate condition requiring GSX PL to file an annual report on the offsetting of emissions from ICP and VIGP.

Furthermore, I am of the view that it is inappropriate for the Board to impose such a reporting condition. GSX PL, the applicant before the Board with respect to the Project, would not own or operate either ICP or VIGP. BC Hydro is the party that has committed to offset the GHG emissions from the two plants. Given this, enforcement of the condition against GSX PL would be problematic; GSX PL may not be able to obtain the information necessary to comply with the condition, as that information relates to offsets to emissions from facilities over which it has no control. This would be even more the case if the VIGP were to be sold by BC Hydro to a third party. I also note that BC Hydro's commitment was 'voluntary'; tying such a commitment into a certificate condition would clearly discourage such voluntary initiatives in the future. Companies should be encouraged to be proactive and responsible, particularly at a time when regulatory requirements and standards with respect to GHG emissions are only beginning to evolve.

To summarize, I see no need to impose such a condition in light of Environment Canada's statement and, furthermore, the condition is, in my view, inappropriate in the circumstances of this case.

3.1.3 Response of the Government of Canada

Pursuant to subsection 37(1.1) of the CEA Act, the responsible authorities took into consideration the JRP Report and, with the approval of the Governor in Council, responded to the JRP Report (government response). The government response was approved by the Governor in Council and released on 21 November 2003. The government response accepts the Panel's recommendation that the Project be allowed to proceed to regulatory decision-making and indicates that, provided the environmental commitments made by GSX PL in its Application, the undertakings made during the joint review process and the Panel's recommendations, as supplemented and clarified by the government response, are implemented, the Project is not likely to cause significant adverse environmental effects.

The Panel notes that where departments and agencies, other than the NEB, have a regulatory decision to make in respect of the Project, the government response identifies additional requirements for GSX PL pursuant to the regulatory processes of those departments and agencies. In these instances, the government response accepts the Panel's recommendations, but with conditions highlighting issues relevant to approvals processes for other government agencies and departments, such as Fisheries and Oceans Canada (DFO) and Environment Canada. For example, for Recommendation 1 of the JRP Report, the government response states that GSX PL should consult with appropriate federal regulatory and science agencies regarding pre-construction surveys, including results and mitigation measures. (Refer to Condition 20 in Appendix 3 of these Reasons.) These additional requirements are matters between GSX PL and other federal departments and agencies and have not resulted in any changes to the conditions to be included in the certificate.

The Panel notes that for Recommendation 5 of the JRP Report, the government response states that the jetting construction method for the Project is not acceptable. DFO has committed to work with GSX PL to identify construction alternatives with lesser environmental impacts than jetting. In light of DFO's comments, it is unlikely that jetting will be used as a method for construction. However, the Panel has decided to retain the condition since the preferred method of construction has not yet been finalized. (Refer to Condition 13 in Appendix 3 of these Reasons).

With respect to Recommendation 8 of the JRP Report, the government response accepts the intent of the Panel to restrict construction activities in the marine environment in areas of concern. However, the government response indicates that DFO has concerns about the timing for sensitive areas such as Boundary Pass, which is utilized by the southern resident orca population. The response indicates that DFO had meetings with GSX PL and that GSX PL had agreed in principle to a work window for Boundary Pass that is acceptable to DFO. The government response further indicates that discussions are continuing in regard to other construction activities having a lesser potential impact which may not necessarily require as strict an adherence to the November to March window. The Panel recognizes that DFO may require more restricted times within the identified construction window for certain sensitive areas along the route. With respect to areas of lesser concern, should DFO agree to an extension of the construction window beyond 30 April, the Certificate condition would require GSX PL to advise the Board of the outcome of its consultations with DFO in this regard, in addition to the other requirements identified in the condition.

The Panel, on behalf of the NEB as a Responsible Authority, took the JRP Report and the government response into consideration before making its decision under the NEB Act. The recommendations in the JRP Report, including those related to follow-up programs, will be included as certificate conditions.

3.2 Socio-Economic Matters

GSX PL filed a socio-economic impact assessment for the project area. This assessment considered the potential effects the Project would have on various socio-economic resources and values. The JPR discussed include the potential impact of the Project on human health, resource industries such as agriculture, forestry and fishing, and the current use of lands and resources for traditional purposes by First Nations. The Panel considered the remaining socio-economic effects under the NEB Act in Section 3.1.2 of these Reasons.

GSX PL stated that construction of the proposed Pipeline would generate approximately 91 person-years of direct employment, resulting in approximately CDN $4.1 million of direct income benefits. Most of this employment would consist of skilled and semi-skilled construction positions, which would potentially be supplied or serviced by the locally available workforce. GSX PL estimated that the spin-off employment would be approximately 81 to 162 person-years resulting in approximately CDN $3.1 to $6.3 million of indirect income benefits. The proposed Pipeline is expected to generate two permanent positions during its operation. GSX PL stated that it would encourage the employment of local-area residents, residents of BC and other Canadian provinces and that it has strategies in place to optimize local and First Nation hires. Additionally, local and First Nation contractors would be invited to bid on aspects of the Project for which they are qualified and a business registry would be established to identify and profile local firms that would be able to provide goods and services for the Project.

The Project would generate government revenue by way of personal income tax, provincial sales tax, property tax, BC corporate capital tax, and corporate income tax. The province's long-term operational tax base would increase as well.

At the hearing, both Mr. Campbell and Northern Pipeline Projects Limited expressed the view that Canadian workers should be used for the construction of the marine section of the proposed Pipeline. GSX PL explained lay barges of the type to be used for the construction of the marine section of the proposed Pipeline are specialized vessels. A limited number of lay barges are available globally, none of which are operated by Canadian companies. GSX PL stated that these vessels are typically contracted with a crew and that GSX PL would not be able to influence the use of local workers on the barge. The welders on these vessels would be certified to work in both Canada and the US; therefore the same crew would be used for both the Canadian and US sections.

The Vancouver Island Advanced Technology Centre (VIATEC), an association that promotes and enhances the development of advanced technology industry on Vancouver Island, expressed support for the Project. It stated that an adequate supply of reliable electricity at a reasonable cost is required to meet the needs of the growing Vancouver Island economy. A major contributor to this growth is the high-technology sector, which some have estimated generates revenues in excess of CDN $1 billion annually. VIATEC noted that its members are concerned about the risk of power outages and that several viable options for future power supply, including the generation facilities that would be fuelled by the Project, are key to serving the needs of its members and to providing for many new jobs in BC.

In terms of benefits from the project to First Nations, GSX PL stated that it had been in contact with First Nations to identify qualified resources and that GSX PL will encourage First Nations to take advantage of economic and social opportunities that the Project may present. (Refer to Section 3.3.2 of these Reasons.)

On 24 February and 11 March 2003, the Panel received letters from the Tseycum First Nation, Cowichan Tribes and Sencot'en Alliance indicating that they had reached an agreement with GSX PL and that their concerns had been addressed. In addition, the Sencot'en Alliance requested that the Panel incorporate the conditions set out in Schedule A of their agreement with the Applicant in any approval which the Panel may grant for the Project.

Views of the Panel

> The Panel is satisfied that, to the extent possible, the Project would maximize socio-economic benefits to the local and regional communities including First Nations communities. Additionally, given the relatively small number of incoming workers and the short duration of construction activities, the Project would not have a significant adverse effect on the services and infrastructure of the local communities.
>
> With respect to the request of the Sencot'en Alliance to have the conditions set out in Schedule A of its agreement with the Applicant incorporated into any approval that may be granted for the Project, the

Panel notes that Schedule A is part of a private formal agreement between GSX PL and the Sencot'en Alliance. Should a dispute arise from this private agreement, the NEB would not be in a position to mediate or resolve the dispute. Rather, the appropriate forum for the resolution of a dispute or the enforcement of the agreement would be a court of competent jurisdiction. Therefore, the Panel has decided not to incorporate the conditions of this agreement as certificate conditions.

3.3 Public Consultation

3.3.1 Early Public Notification

The NEB's *Guidelines for Filing Requirements, 1995* (GFR) require an applicant to implement an early public notification (EPN) program to explain the project, its potential environmental and socio-economic effects, and to allow an opportunity for public comment. The EPN program also provides an opportunity for those potentially affected by the project to identify issues and concerns and for the applicant to try to resolve issues.

GSX PL's EPN and Public Involvement Program provided opportunities for interested parties to participate in discussions dealing with corridor selection, and route identification and refinement. GSX PL stated that its Public Involvement Program is ongoing and provided documentation to that effect.

The public consultation processes are described in more detail in Section 15.2 of the JRP Report.

3.3.2 Consultation with First Nations

In the Application, GSX PL identified eight First Nations with interests in the Project area: Pauquachin, Tsartlip, Tsawout, Semiahmoo, Tseycum, Malahat and Tsawwassen First Nations, as well as the Cowichan Tribes. On 26 April 2001, the first four of these First Nations signed a protocol agreement which, among other things, stated they would work collaboratively on the Project and would be known as the Sencot'en Alliance. Consultation between First Nations and BC Hydro, who was consulting on behalf of GSX PL, was initiated in the latter part of 1999 and carried on throughout the GH-4-2001 proceeding.

The Cowichan Tribes, Tseycum First Nation and the Sencot'en Alliance submitted that the Project would have an impact on their treaty and aboriginal rights. They also submitted that there was no evidence in the Application that any Crown consultation had taken place. As a result, in January 2002, the Panel issued an IR to the federal and provincial Crown intervenors and GSX PL inquiring about activities undertaken to meet any duty the Crown may have to consult. The responses to this IR indicated that no Crown consultation had taken place.

The Panel attended two sessions to hear presentations regarding First Nations issues at Duncan and Sidney, BC in January 2002 as part of its consultation with the public on the information required and the issues that should be considered during the hearing. During these sessions, the Panel heard First Nations express concern that although BC Hydro had met with them on a number of occasions, these meetings did not satisfy the Crown's duty to consult. They submitted that the duty to consult arose because both the marine and terrestrial route traversed their traditional territory and this would have an impact on their rights, whether they were Douglas Treaty rights[25] or aboriginal rights. Following the public consultation sessions, the Panel amended the List of Issues to include the following:

- the adequacy of consultation with First Nations regarding the proposed Project; and
- the potential impact of the proposed Project on First Nation communities, traditional use activities, and their treaty and aboriginal interests.

Initially the Cowichan Tribes, Sencot'en Alliance and the Tseycum First Nation intervened in the proceeding. Later in the process the Snuneymuxw First Nation applied for, and was granted, intervenor status.

On 4 March 2002, the NEB, independently of the GH-4-2001 proceeding, issued a general Memorandum of Guidance (Memorandum) regarding Consultation with Aboriginal Peoples. This Memorandum was summarized as follows in the Panel's letter to GSX PL dated 8 March 2002:

> *This Memorandum is a statement of the National Energy Board's (the Board) position regarding the Crown's fiduciary duty to consult with Aboriginal peoples. Generally, the Memorandum states that the Board, as a quasi-judicial tribunal, does not have a fiduciary duty to consult with Aboriginal groups whose rights may be infringed by the effects of a decision it may make on a facilities application. Rather, the Board is of the view that it has a responsibility to determine whether there has been adequate Crown consultation before rendering its decision in cases where an aboriginal or treaty right may be infringed by a decision of the Board. It goes on to say that applicants are expected to contact the appropriate Crown department or agency to ensure that the requisite Crown consultations are carried out and to arrange for the information pertaining to those consultations to be filed with the Board.*

In its 8 March 2002 letter to GSX PL, the Panel noted that it shared the Board's position as outlined in the Memorandum and expected that prior to the commencement of the oral hearing, GSX PL would provide evidence that consultation had been carried out.

In the course of this proceeding, the British Columbia Court of Appeal issued three important decisions on consultation with First Nations pursuant to section 35 of the *Constitution Act*. In *Taku River Tlingit First Nation v. Ringstad*[26] the Court rejected the Crown's argument that the obligation to consult is only triggered when an aboriginal right has been established in court proceedings. This view was further expanded upon by the Court in the *Haida I* case.[27] In *Haida I*, the Court held that the duty to consult lay in the trust-like fiduciary obligation held by the provincial and federal Crowns to aboriginal people and that it did not depend on legal proceedings to define the aboriginal rights in order for the duty to exist. Moreover, according to the BC Court of Appeal, the duty to consult includes in it an obligation to accommodate the concerns of aboriginal people. The Court determined that both the duty to consult and accommodate are proportional to the potential soundness of the claim for aboriginal title and aboriginal rights. In *Haida II,*[28] the majority of the Court further declared that the duty to consult and accommodate extended to private licensees operating under a Crown permit. The Supreme Court of Canada has granted leave to appeal in both of these cases.

---

[25] Douglas Treaty rights relate to pre-confederation treaties signed between the Crown and some First Nations on Vancouver Island. The scope of the treaties is commonly reported to include a "liberty to hunt over the unoccupied lands" and the right to "carry on our fishery as formerly."

[26] [2002] 4 W.W.R. 19

[27] *Haida Nation v. British Columbia and Weyerhaeuser* [2002] 6 W.W.R. 243

In April 2002, the Panel issued its second IR for an update on Crown consultation activities and, in addition, asked the applicant to comment on the following:

- how GSX PL will ensure that evidence of Crown consultation will be filed prior to the commencement of the oral hearing (scheduled at that time for 17 June 2002); and
- the practicality of meeting the current hearing schedule as outlined in the Directions on Procedure.

Parties to the GH-4-2001 proceeding were asked to provide their comments on GSX PL's responses. After considering the comments of all parties, the Panel issued its 31 May 2002 decision which revised the schedule for the proceeding and did not set a date for the oral hearing. The Panel stated it would determine whether and when to set the application down for hearing after a further round of comments on consultation. These comments would be requested after the filing of intervenors' written evidence. The Panel also stated that it expected information would be available at that time on the nature of First Nations' interests and concerns in relation to the potential effects of the proposed Project and whether consultation had taken place.

A third IR on Crown consultation was issued on 1 October 2002 to the same parties, asking them to update the Panel on the progress of any consultation activities. A final request for an update was issued on 19 November 2002 in preparation for the Panel's determination of whether and when to set the application down for the oral hearing. This IR was also forwarded to all eight First Nations identified as having interests in the Project, requesting their comments on consultation that had taken place to date. In response to these IRs, the federal Crown Intervenors stated they had had some preliminary meetings with the Sencot'en Alliance and the Cowichan Tribes, although no progress had been made on substantive issues. The Province of BC stated that it would be participating as an observer in consultation meetings with the federal Crown and any consultation it would carry out would be in accordance with its policy on consultation, dated September 1998. The Sencot'en Alliance, the Cowichan Tribes and the Snuneymuxw First Nation responded and confirmed that substantive progress on consultations had not been made.

On 25 November 2002, the Panel requested comments from parties on the readiness of the application to be set down for hearing. After consideration of these comments, in its 13 January 2003 letter, the Panel set the hearing date; however, it advised that if it was not satisfied at the conclusion of the evidentiary phase of the hearing that meaningful consultation had been carried out, it did not intend to proceed to its final deliberations in respect of the Application.

---

[28] Haida Nation v. Weyerhaeuser [2002] 10 W.W.R 587

On 28 November and 12 December 2002, the Cowichan Tribes informed the Panel that they were in active discussions with the applicant and were optimistic that these discussions would lead to a mitigation and benefits agreement. On 24 February 2003, the Tseycum also informed the Panel that it was in discussions with the Applicant, that its concerns had been substantially addressed and that it was satisfied that adequate consultation had occurred.

On 11 March 2003, during the oral hearing, the Panel received letters from both the Cowichan Tribes and the Sencot'en Alliance. The Cowichan Tribes stated that they had entered into a private agreement with the Applicant and that they expected that although consultation would continue with the Crown, it would be limited to issues of habitat compensation with DFO and discussions with the Province regarding routing and protection in the Cape Keppel area. They stated that they were prepared to accept that consultation had been adequate at this time to permit the issuance of a certificate to the Applicant. On 11 March 2003 the Sencot'en Alliance advised the Panel in a letter that they also had reached an agreement with GSX PL which addressed their concerns. They further advised that a consultation process had been agreed to with the federal and provincial Crown and they were satisfied that this process would address their outstanding concerns. As a result, both the Cowichan Tribes and the Sencot'en Alliance withdrew their interventions from the proceeding.

Views of the Panel

The Panel is satisfied that all First Nations in the Project area were provided with sufficient information about the Project and that they were given the opportunity to enter into meaningful discussions with the Applicant with respect to the concerns they had about the Project. The Panel is encouraged by the fact that the Applicant reached agreement with the Cowichan Tribes, the Tseycum First Nation and the Sencot'en Alliance with respect to the Project. All three withdrew their interventions and indicated to the Panel either that their concerns had been adequately addressed or that discussions were ongoing and they were confident that their concerns would be adequately addressed. In light of the position of these First Nations, the Panel did not find it necessary to further address the issue of Crown consultation in the proceeding or in these Reasons.

With respect to the Snuneymuxw First Nation, the Panel notes that its concerns focused on the proposed VIGP. Although the Panel decided to look at the environmental effects of the emissions from VIGP under the NEB Act, it did not conduct a full environmental assessment of the VIGP, nor does it have the ability to approve or regulate that project. The Snuneymuxw First Nation was involved in the provincial review process and did not participate in the Crown consultations on the Project or in the oral hearing.

3.4 Routing and Land Matters

The concerns identified by intervenors regarding routing and land matters focused on the selection process for the route, land requirements, the process for land acquisition and specific concerns arising from the statutory requirement for a 30 m safety zone adjacent to the pipeline.

GSX PL used a sequential process of identifying a corridor and then a route within the corridor. The marine corridor identified by GSX PL was a 600 m wide band, while the marine route would be a 10 m to 50 m permanent easement centered on the pipeline. The terrestrial corridor identified by GSX PL was a 200 m wide band, while a terrestrial route would be the actual construction right-of-way consisting of 16 m of permanent easement, 7 m to 10 m of additional temporary workspace and possibly extra temporary workspace where required. The corridor and route selection processes are described in Section 2.3.1- Alternative Corridors and Routes of the JRP Report.

The proposed Pipeline would require new permanent right-of-way and temporary workspace for the construction. The marine portion would require a 10 m wide easement, with the exception of a section near Ecological Reserve 67, which would require a 50 m wide easement. Since the marine pipeline would be installed using a dynamically positioned vessel, additional workspace outside of the permanent easement is not necessary. The terrestrial portion would require a 16 m wide permanent easement with 10 m of workspace on agriculture-use lands and 7 m of workspace on other lands. Extra workspace would be needed to facilitate construction at specific locations, such as road, railway crossings, stream crossings, sidehill areas, steep grades, staging areas, and the HDD at the Manley Creek shore crossing. GSX PL's interconnection facilities with the Centra system would be located on a 2.38 hectare parcel of land.

GSX PL filed sample land acquisition documents to demonstrate compliance with sections 86 and 87 of the NEB Act and stated that it would conduct its land acquisition activities in accordance with the NEB Act and established industry practices. The 30 m safety zone is a statutory requirement to protect the pipeline from third party damage that may harm the environment or place the public at risk. Subsection 112(1) of the NEB Act, subject to subsection 112(5), regulates the construction of facilities across, on, along or under a pipeline or excavation performed by power-operated equipment or using explosives within 30 m of a pipeline right-of-way. As part of its public involvement program, GSX PL consulted with the owners of the lands that would be required for the pipeline and with the owners of the lands that would be affected by the 30 m safety zone. GSX PL distributed copies of the NEB's bulletins and guides that outline the rights and remedies available to landowners, and advised owners of the procedures and principles it would follow during the pipeline approval and land acquisition processes.

Farmers and landowners affected by the proposed right-of-way formed an association called the Vancouver Island Pipeline Landowners Association (VIPLA), which represents more than half of the 23 landowners whose lands would be crossed by the right-of-way. VIPLA was concerned with the appropriateness of the right-of-way width for the proposed Pipeline and the need for temporary workspace. VIPLA also had concerns with some of the terms of the easement agreements, such as easement width, compensation issues, access on adjacent land in the event of emergency, abandonment, and the fact that landowners would require GSX PL's permission to grant other interests in the land. VIPLA and other landowners expressed concerns about the potential impact on farming operations of the construction and operation of a pipeline built on their properties. VIPLA also proposed having a third party that would represent the landowners, monitor construction and be a liaison between the landowners and GSX PL.

Ms. McLennan expressed concerns that landowners had to accept an easement without having seen or signed the land survey and that the land acquisition process began prior to any Board approval.

VIPLA, other landowners, adjacent landowners and intervenors were concerned that subsection 112(1) imposed a requirement to seek permission when planning an excavation or construction activity within 30 m of the pipeline right-of-way. Their concerns included the effects on their property rights, the time that it would take for the company to respond, and the restriction of activities in the 30 m safety zone. GSX PL responded that there would be no restriction on development within the 30 m safety zone. The only requirement is that anyone planning to excavate using power-operated equipment or explosives within the safety zone must first obtain permission from GSX PL. Furthermore, there would be GSX PL operation personnel located on Vancouver Island who would respond to requests for permission to excavate within the 30 m safety zone.

Views of the Panel

The Panel has considered the potential effects of the construction of the proposed Pipeline on affected landowners, including the amount of land required for easements, GSX PL's acquisition documents and acquisition process, and the potential effects on farm operations.

The Panel notes that VIPLA and GSX PL entered into a settlement on landowner issues, which included the appropriateness of the width of the right-of-way, the easement agreements, and the potential effects on farming operations. The Schedule of Resolved Issues, filed with the Panel at the start of the oral hearing, listed the agreement that was reached for each of VIPLA's concerns.

The Panel is of the view that GSX PL's anticipated requirements for easements are reasonable and justified in this application and the Panel has no concern with the acquisition process. The Panel concluded in the JRP Report that the criteria used in selecting the preferred corridor and general route were appropriate. The Panel is of the view that the general route of the proposed Pipeline is acceptable.

With respect to the 30 m safety zone, the Panel notes that the primary purpose of section 112 of the NEB Act, including the NEB's *Pipeline Crossing Regulations*, is to provide for the safety of the public and for the safe operation of pipelines under the NEB's jurisdiction. The 30 m safety zone is a statutory requirement to protect the pipeline from third party damage that may harm the environment or place the public at risk. These provisions do not create an interest in land, nor do they prevent landowners from carrying out most activities on their properties. With respect to the responsibility of landowners to seek permission prior to excavation or construction activity involving power equipment or explosives within 30 m of limits of the right-of-way, the Panel notes that this requirement serves to protect persons working in the vicinity of the pipeline. The *Pipeline Crossing Regulations* outline the steps that a third party and the pipeline company must follow to protect the pipeline and, consequently, the public and the environment, from damage that may result from unauthorized excavation or construction activity.

The 30 m safety zone should not be confused with the right-of-way acquired by the pipeline company for the construction, operation and maintenance of its pipeline. In the right-of-way, landowners are prohibited from carrying out many activities and the pipeline company acquires an interest in the land pursuant to the easement agreement. By contrast, in the 30 m safety zone, the pipeline company holds no property interest and landowners may continue to carry out usual activities subject to the provisions of section 112 of the NEB Act and the related *Pipeline Crossing Regulations*.

Chapter 4

Traffic, Tolls and Tariffs, and Financial Matters

4.1 Financial Matters

4.1.1 Project Financing

Construction financing for the Project is being provided to GSX PL by BC Hydro. Once the proposed Pipeline is commissioned, the intent is to replace the construction financing with more permanent financing. It is expected that the project debt would be 70 per cent of the total capital, with the remainder of the financing capital coming from equity contributions from the partners in GSX PL. Powerex, a wholly-owned subsidiary of BC Hydro, has contracted for the entire initial firm capacity of the proposed Pipeline for 30 years.

In response to questions from GSXCCC regarding Williams' current financial position, GSX PL witnesses indicated that Williams is currently divesting itself of non-core assets. In addition to having sufficient funds to repay all debt requirements in 2003 and 2004, Williams expects to have a cash balance of US $1.65 billion at the end of 2004. Additionally, agreements provide that in the event of an insolvency of Williams, BC Hydro would have the right to purchase the Williams interest in the proposed Pipeline for the book value of those assets.

4.1.2 Corporate Structure

The Georgia Strait Crossing Project is jointly sponsored by BC Hydro and Williams, with each holding approximately 50 per cent of the ownership in the overall Canadian and US project through a limited partnership structure.

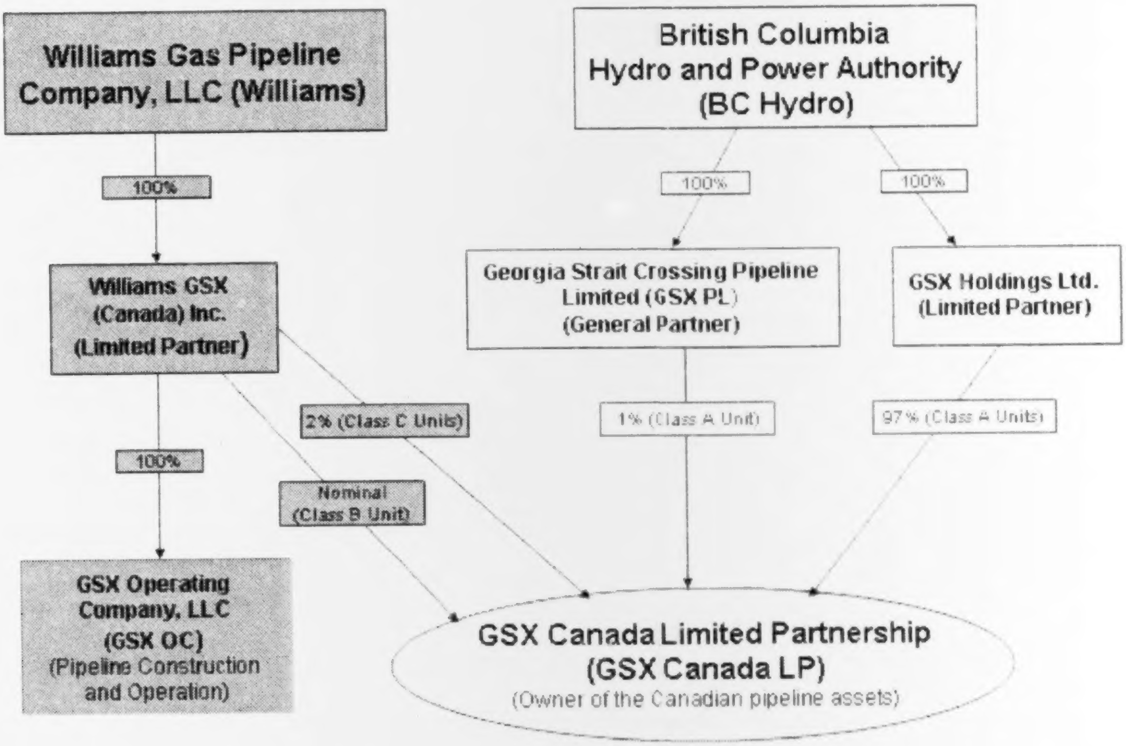
GSX Canada LP is the limited partnership that would own the proposed Pipeline (i.e., the Canadian portion of the Georgia Strait Crossing Project). GSX PL is the general partner, and GSX Holdings Ltd. and Williams GSX (Canada) Inc. are the limited partners of GSX Canada LP. GSX PL and GSX Holdings Ltd. are wholly owned by BC Hydro and have a combined 98 per cent interest in GSX Canada LP. Williams, through its wholly owned affiliate Williams GSX (Canada) Inc., has the other 2 per cent interest in the partnership. Refer to Figure 4-1 for the Panel's schematic representation of the corporate structure.

The general partner, GSX PL, would hold the assets of the proposed Pipeline on behalf of the limited partnership and for the benefit of the limited partners. The proposed Pipeline would be constructed and operated by GSX PL on behalf of the proposed Pipeline's owner, GSX Canada LP.

GSX PL, as operator, has engaged GSX OC, an affiliate of Williams, to perform engineering procurement and construction management activities during construction and to operate the pipeline following commissioning.

GSX PL provided details of the corporate structure, the various corporate entities involved and their financial information, and identified the directors and owners of the corporate entities. Ms. McLennan, Shadybrook Farm and Braithwaite Estates expressed concern that the corporate structure was complex and designed to shield BC Hydro and Williams from liability in the event of any incident or failure. Ms. McLennan suggested that the corporate structure had been designed to distance BC Hydro and Williams from the Project and from any liability.

Figure 4-1
GSX Canada Pipeline – Ownership and Operation


Williams Gas Pipeline Company, LLC (Williams)
British Columbia Hydro and Power Authority (BC Hydro)
100%
100%
100%
Williams GSX (Canada) Inc. (Limited Partner)
Georgia Strait Crossing Pipeline Limited (GSX PL) (General Partner)
GSX Holdings Ltd. (Limited Partner)
2% (Class C Units)
1% (Class A Unit)
97% (Class A Units)
100%
Nominal (Class B Unit)
GSX Operating Company, LLC (GSX OC) (Pipeline Construction and Operation)
GSX Canada Limited Partnership (GSX Canada LP) (Owner of the Canadian pipeline assets)

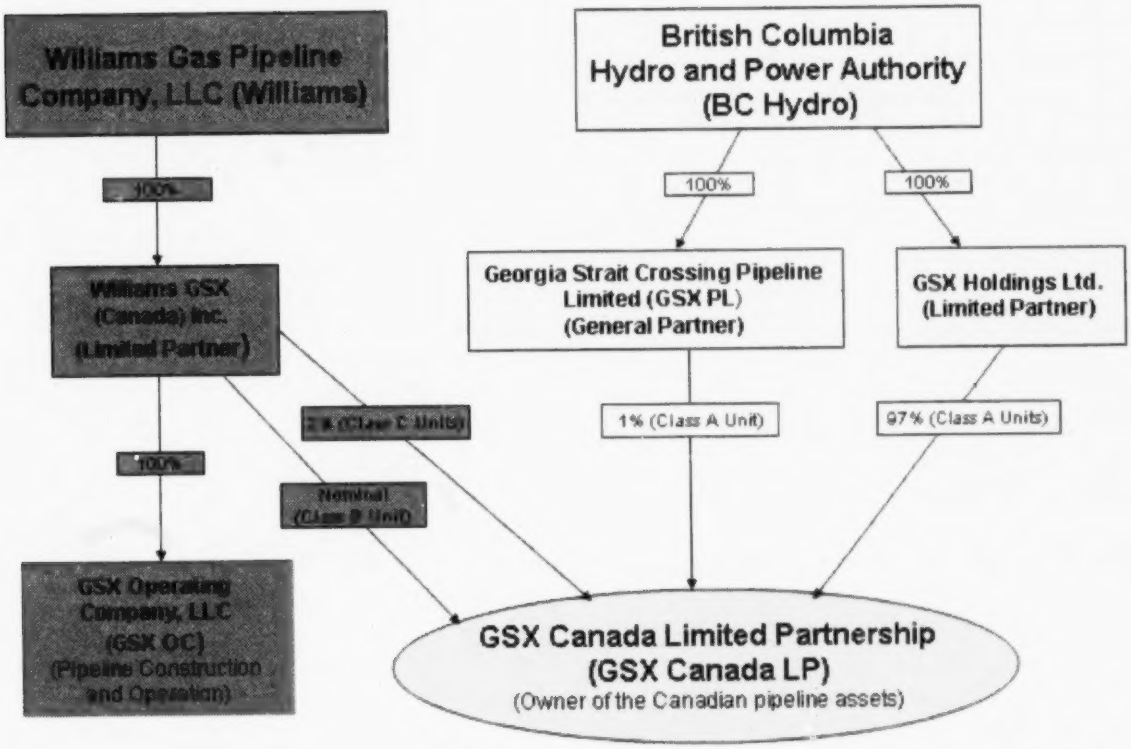
4.2 Ability of Proponent to Manage Risk and Financial Liabilities

GSXCCC, Shadybrook Farm, Braithwaite Estates and Ms. McLennan expressed concern with respect to GSX PL's ability to meet financial liabilities arising from potential pipeline failures, malfunctions and accidents during the construction, operation and decommissioning of the project.

GSX PL submitted in an IR response that it would procure builder's all-risk insurance in an amount adequate to cover the costs associated with construction up to full replacement value of the insurable assets. It would also purchase all-risk property insurance in an amount to cover all insured risks associated with the operation of the project up to full replacement value of the insurable assets. In addition, GSX PL stated it would hold general or excess liability insurance

GSX PL provided details of the corporate structure, the various corporate entities involved and their financial information, and identified the directors and owners of the corporate entities. Ms. McLennan, Shadybrook Farm and Braithwaite Estates expressed concern that the corporate structure was complex and designed to shield BC Hydro and Williams from liability in the event of any incident or failure. Ms. McLennan suggested that the corporate structure had been designed to distance BC Hydro and Williams from the Project and from any liability.

Figure 4-1
GSX Canada Pipeline – Ownership and Operation


Williams Gas Pipeline Company, LLC (Williams)
100%
Williams GSX (Canada) Inc. (Limited Partner)
100%
GSX Operating Company, LLC (GSX OC) (Pipeline Construction and Operation)
2 % (Class C Units)
Nominal (Class B Unit)
British Columbia Hydro and Power Authority (BC Hydro)
100%
100%
Georgia Strait Crossing Pipeline Limited (GSX PL) (General Partner)
GSX Holdings Ltd. (Limited Partner)
1% (Class A Unit)
97% (Class A Units)
GSX Canada Limited Partnership (GSX Canada LP)
(Owner of the Canadian pipeline assets)

4.2 Ability of Proponent to Manage Risk and Financial Liabilities

GSXCCC, Shadybrook Farm, Braithwaite Estates and Ms. McLennan expressed concern with respect to GSX PL's ability to meet financial liabilities arising from potential pipeline failures, malfunctions and accidents during the construction, operation and decommissioning of the project.

GSX PL submitted in an IR response that it would procure builder's all-risk insurance in an amount adequate to cover the costs associated with construction up to full replacement value of the insurable assets. It would also purchase all-risk property insurance in an amount to cover all insured risks associated with the operation of the project up to full replacement value of the insurable assets. In addition, GSX PL stated it would hold general or excess liability insurance of not less than $75 million per occurrence and in the aggregate for bodily injury, including death and property damage, which would remain in place during the course of construction, commissioning and subsequent operations. GSX PL indicated that its assessment of risk was arrived at in consultation with insurance brokers and was based on their assessment of the maximum probable liability loss. GSX PL stated that it believed that the insurance placed was adequate to cover future liabilities and that additional forms of security would not be necessary. Insured limits for earthquake, earth movement, volcano, tsunami and similar risks would depend on availability at the time the insurance is procured.

GSX PL relied on the analysis of rating agencies such as AM Best to select insurers. Only insurers rated at least A-VIII (Excellent) were selected. The insurers selected have AM Best ratings of A-XI and A-XIV, which are substantially in excess of the A-VIII rating.

GSX PL stated that it plans to manage the risk and financial liabilities by supplementing the insurance coverage with guarantees, indemnities and performance surety bonds or letters of credit. The performance of GSX OC is guaranteed by Williams to the extent of CDN $22.5 million. GSX PL also stated that contractors will provide indemnities in favor of GSX PL for certain losses and damages, and certain contractors will provide performance surety bonds or letters of credit, during construction and decommissioning.

GSX PL pointed out that, in addition to the insurance and written guarantee referenced above, there is the equity in GSX Holdings Ltd. and Williams GSX (Canada) Inc., the companies that own the pipeline assets. These assets would be substantial at the end of construction.

4.3 Traffic, Tolls and Tariffs

Powerex has subscribed for all of the initial available capacity on the proposed Pipeline. GSX PL and Powerex have negotiated the principles that would determine the firm service toll payable by Powerex. Interruptible transportation service would be offered on terms outlined in the Gas Transportation Tariff.

4.4 Method of Regulation

GSX PL requested that the proposed Pipeline be designated as a Group 2 pipeline for the purposes of toll and tariff regulation. The Board regulates the traffic, tolls and tariffs of Group 2 companies on a complaint basis. In support of this request, GSX PL noted that the proposed Pipeline is of a much smaller size than Group 1 pipelines under the Board's jurisdiction. It also noted that there would initially be only one firm service shipper on the proposed Pipeline and that GSX PL and the shipper have negotiated the principles that would determine the toll payable by the shipper for firm service.

Several intervenors submitted that the shipper, Powerex, would have no interest in registering a complaint against a company in which its parent, BC Hydro, holds a significant interest and, therefore, the actual cost of service would be flowed through to Powerex without any independent scrutiny.

Views of the Panel

Given the substantial assets of BC Hydro, which is a sponsor of the Project, the Panel is of the view that there appears to be no impediment to raising the necessary funds to finance the construction of the proposed Pipeline.

The Panel notes that, although the corporate structure for the project is complex, a company may organize its business affairs as it deems appropriate in the circumstances. It is not unusual for a pipeline company to contract with other companies to construct or operate a pipeline. There is no indication from the evidence that the corporate structure resulted from a desire to create a business structure of unusual complexity for the purposes of creating a firewall to inappropriately limit liability. The Panel expects GSX PL to procure and maintain sufficient insurances to meet potential financial risks and liabilities related to pipeline failures, malfunctions and accidents during the construction, operation and decommissioning of the proposed Pipeline.

The financial regulation of Group 2 companies under the NEB Act is carried out on a complaint basis, with limited requirements for financial reporting. As GSX PL is of a smaller size than Group 1 natural gas pipelines under NEB jurisdiction, and as there would initially be only one shipper, the Panel is of the view that it would be appropriate for GSX PL to be regulated as a Group 2 pipeline under the NEB Act. GSX PL would be required to keep its books of account pursuant to the code of accounts prescribed in the *Gas Pipeline Uniform Accounting Regulations* and to file audited annual financial statements.

GSX PL provided its Gas Transportation Tariff for the proposed Pipeline and indicated that interruptible transportation service would be offered. The method for determining the toll for such service is outlined in the General Terms and Conditions of the Tariff. Should a third party request service on GSX PL's pipeline, GSX PL would be required to file a tariff and tolls schedule pursuant to subsection 60(1) of the NEB Act. Further, this tariff would include the explanatory note set out in Schedule B of the *Memorandum of Guidance on the Regulation of Group 2 Companies* indicating that persons who cannot resolve traffic, tolls and tariff issues with GSX PL may file a complaint with the Board.

Chapter 5

Supply, Markets and Economic Feasibility

5.1 Justification for the Project

Under a precedent agreement between GSX Canada LP and Powerex, Powerex has contracted firm transportation capacity of 100.97 TJ/d for 30 years on the proposed Pipeline. This is the entire initial capacity of the pipeline and would primarily supply two gas-fired electricity generation plants on Vancouver Island. One of the plants, ICP, is currently operating and receiving its gas supply from the Centra system. The other plant, VIGP, was the subject of an application before the British Columbia Utilities Commission (BCUC) at the time of the GH-4-2001 hearing. GSX PL stated that it was not likely to proceed with the proposed Pipeline unless the VIGP receives provincial regulatory approval.[29]

GSX PL submitted that the proposed Pipeline would:

- provide a new infrastructure for delivering natural gas to Vancouver Island;
- increase the security of natural gas supply by using a different pipeline corridor to Vancouver Island;
- provide low-cost future expansion of natural gas transmission capacity to Vancouver Island;
- enhance the capacity and operational flexibility of the existing natural gas transmission and distribution system serving Vancouver Island;
- reduce the risk of a natural gas supply shortfall in the Victoria market region by interconnecting with the Centra system near that load centre;
- add to the liquidity of the Sumas/Huntingdon market hub;
- provide employment, business and procurement opportunities in BC; and
- generate additional tax revenue for the Province of BC.

In addition, GSX PL stated that the GSX US Pipeline could attract new shippers with potentially substantial gas requirements in the western part of Washington State. These new shippers would provide incremental revenues to the overall Georgia Strait Crossing Project in excess of the incremental costs of capacity additions, which would reduce the overall cost of delivering gas to Vancouver Island.

---

[29] An application for the VIGP was filed with the BCUC in March 2003. For further discussion, refer to the Views of the Panel in Section 5.3 - Markets and Need for the Proposed Pipeline.

5.2 Gas Supply

Under the NEB's GFR, an applicant is required to file evidence concerning both shipper-specific gas supply and overall gas supply.

5.2.1 Shipper-Specific Supply

Powerex, the only shipper on the proposed Pipeline, plans to acquire natural gas by way of short-term and intermediate-term gas purchase contracts with transactions conducted primarily at the Sumas/Huntingdon market hub. GSX PL submitted that the Sumas/Huntingdon market hub is a long-standing, liquid and transparent buy-sell market and that Powerex would not have any difficulty in meeting its gas requirements at this market hub. Powerex's requirements would be approximately 6 per cent of the estimated currently available peak day capacity of the Sumas/Huntingdon hub. Powerex testified that it could also purchase its natural gas supply from other trading points in Canada: Station 2 in BC; the AECO/NIT market hub in Alberta; and in Oregon and Wyoming in the US. Procurement of gas supply from the market hubs in the US would involve purchasing natural gas by displacement.[30] Powerex currently holds 54 TJ/d of capacity on Westcoast's Transportation-South (T-South) system and 44 TJ/d of capacity with TransCanada PipeLines Ltd. (TransCanada) on TransCanada's BC and Alberta systems.

As a result of the proposed Powerex supply arrangements, GSX PL requested relief from the requirement to file shipper-specific gas supply information as set out in sections 3, 4 and 5 of Part III of the GFR. The Panel granted this relief on 15 March 2002.

5.2.2 Overall Supply

GSX PL submitted that there is ample evidence of adequate gas supply for the pipeline. It referred to the recently applied-for expansion of the Westcoast system (T-South, and two T-North expansions) and the TransCanada Westpath expansion. These expansions received long-term contractual support from shippers; for example, the volume-weighted average primary term of the contracts for the T-South expansion was 27 years. The commitments made by the shippers involve large financial costs associated with entering into the contracts for new capacity, which is an indication that those parties expect to ship natural gas for the long term. GSX PL stated that the Sumas/Huntingdon hub would continue to be attractive to producers into the future because they receive a netback[31] advantage by selling their natural gas at market hubs in Alberta and BC rather than at Dawn, Ontario.

GSX PL submitted that the long-term outlook for both total energy and natural gas supply and demand for Canada and the US indicates that natural gas will continue to be an important and growing source of energy and that natural gas will be available in sufficient quantities at competitive prices over the lifetime of the proposed Pipeline.

---

[30] Instead of Canadian gas supply moving southward along the Northwest Pipeline system to US markets, US gas supply can be transported northward by the same pipeline to supply US markets currently served by Canadian natural gas exported from Sumas/Huntingdon. The displacement of the natural gas results in additional Canadian gas being made available for Canadian markets at Sumas/Huntingdon.

[31] Netback prices are derived by deducting the transportation costs from the supply basin to the end-market from the sales price of the natural gas in the end-markets.

GSXCCC questioned GSX PL's evidence on gas supply. GSXCCC submitted a gas supply study conducted by GasEnergy Strategies Inc. which provided forecasts of gas production. GSXCCC argued that only some of the documents referenced by GSX PL, such as TransCanada's supply information from its Westpath application, could be considered beneficial in examining gas supply. Other documents referenced by GSX PL were of no benefit in examining the question of the adequacy of gas supply (for example, the US Department of Energy, Energy Information Administration's Annual Energy Outlook 2002 with Projections to 2020, December 2001). Based on its analysis, GSXCCC submitted that GSX PL had not established that there is sufficient natural gas supply to support the long-term utilization of the proposed Pipeline.

GSXCCC also referred to the Board's 2003 document titled *Canada's Energy Future - Scenarios for Supply and Demand to 2025, Draft For Public Consultation*, to support its view that Western Canada Sedimentary Basin (WCSB) remaining marketable gas reserves would decline to zero at either the end of 2029, using the "Supply-Push" scenario, or in the beginning of 2033, using the "Techno-Vert" scenario. GSXCCC submitted that the evidence suggests that the deliverability of conventional supply from the WCSB will be in decline at the middle of the proposed Pipeline's lifespan. It further submitted that projections of a dramatic increase in the production of non-conventional gas in the WCSB are highly speculative and that the economic feasibility of the proposed Pipeline is threatened by the possibility of higher prices for natural gas.

Dr. Fisher, Ms. McLennan and Shadybrook Farm relied upon GSXCCC's supply evidence to support their arguments on gas supply. These intervenors submitted that even though the demands of the proposed Pipeline would constitute a small proportion of the gas supply available at the Sumas/Huntingdon hub, GSX PL might be at a disadvantage in competing for an increasingly limited supply in the years to come. They argued that the gas supply available for the proposed Pipeline has been overstated by GSX PL and that reliance on gas supply is an avoidable risk to the security of electricity supply on Vancouver Island. The evidence, they said, suggests that a decline in gas supply would require newer and more expensive sources of gas to be drilled and that prices would increase. Powerex, therefore, might not be able to meet its full requirements given the constraints of its operating budget and the declining gas supply.

Views of the Panel

The Panel is of the view that the Sumas/Huntingdon hub is a viable market hub for the sale and purchase of natural gas. There is an economic incentive for producers to continue to supply gas to the Sumas/Huntingdon market hub, rather than to the more distant Dawn, Ontario hub. This economic incentive will continue to encourage producers to sell their gas at the Sumas/Huntingdon hub throughout the economic life of the pipeline. Moreover, in addition to the Sumas/Huntingdon hub, Powerex would have access to supplies from Alberta.

Powerex's requirements would be approximately 101 TJ/d (95.7 MMcf/d) of an estimated 17 400 TJ/d (16,500 MMcf/d), approximately 0.6 per cent of the total current estimated WCSB production. The Panel is of the view that Powerex would be able to meet its contractual transportation commitments using short-term and intermediate-term natural gas supply purchase contracts, with the transactions occurring primarily at the Sumas/Huntingdon hub.

On the issue of overall supply, the Panel heard evidence that in addition to ongoing production from WCSB conventional sources, new sources of supply are presently in various stages of development. The Panel is of the view that conventional and new supply will be accessible to the North American market over the lifetime of the proposed Pipeline and is therefore satisfied that there will be an adequate supply of gas for the proposed Pipeline.

5.3 Markets and Need for the Proposed Pipeline

5.3.1 Demand for Gas on Vancouver Island

Background

In its ruling dated 20 January 2003, the Panel noted that there is a significant degree of interconnection between several of the corporate bodies involved in various ways in the Project. BC Hydro owns 100 per cent of the equity in GSX Holdings Ltd. and GSX PL, which in turn own 97 per cent and 1 per cent of GSX Canada LP, respectively. GSX PL will hold the Canadian assets on behalf of GSX Canada LP and for the benefit of the limited partners. BC Hydro is a 100 per cent owner of the shipper, Powerex. VIEC, another wholly-owned subsidiary of BC Hydro, would be a 100 per cent owner of VIGP, one of the generation facilities that the proposed Pipeline would supply. All of the electricity output of ICP, the other generation facility that would be supplied by the proposed Pipeline, is contracted to BC Hydro. In light of the corporate inter-relationships and the fact that electrical generation facilities form the bulk of the demand for the gas proposed to be transported, the Panel determined that a more wide-ranging inquiry into the economic justification for the proposed Pipeline was relevant to the Panel's ultimate determination under section 52 of the NEB Act. The Panel stated that it would not rely solely on the Powerex precedent agreement as evidence that the proposed Pipeline is economically feasible. As part of its inquiry under section 52 of the NEB Act, the Panel decided to require GSX PL to answer questions that sought to determine the long-term viability of the generation facilities that would be the source of demand for the gas to be transported by the proposed Pipeline.[32]

Electricity Load-Supply Imbalance

GSX PL's witnesses indicated that BC Hydro has been projecting and planning for an imbalance between the expected load and anticipated supply sources of electrical energy on Vancouver Island for some time. The situation was discussed in BC Hydro's Integrated Electricity Plan of 1995. BC Hydro's initial plan was to re-power the Burrard Thermal plant on the mainland and to refurbish or replace some of its existing submarine electricity cables to Vancouver Island, which are approaching the end of their service life. However, the BC government subsequently directed BC Hydro to enter into Power Purchase Agreements with two private power developers on Vancouver Island, both of which were proposing to generate electricity on Vancouver Island using natural gas. The two projects were a proposed facility at Port Alberni and ICP at Campbell River. BC Hydro successfully negotiated contracts with the developers of ICP and the plant was ultimately built. ICP is now an operating cogeneration facility that produces steam, for consumption by a local pulp mill, and electricity, all of which is taken by BC Hydro. The planned plant at Port Alberni has been replaced by a proposal to construct VIGP at Duke Point near Nanaimo.

---

[32] Subsequently, the issues of demand for electricity on Vancouver Island and alternate proposals to meet that demand were addressed by the BCUC in its proceeding with respect to VIEC's application for a Certificate of Public Convenience and Necessity for VIGP.

BC Hydro projects that an electricity shortfall could arise on Vancouver Island as early as the 2006-2007 load year period, based on its forecast of normally expected electricity load growth and the planned retirement[33] of the two subsea cable systems. The current plan is to retire the cable systems by 2007.

GSX PL submitted that BC Hydro would require the dependable full-output capability from ICP and the additional output from VIGP to meet the projected load-supply imbalance on Vancouver Island. The VIGP plant would require committed firm availability of natural gas as a prerequisite to its being built and would require approximately one-half (45 TJ/d) of the capacity of the proposed Pipeline.

Several intervenors questioned GSX PL's evidence on the existence, timing and magnitude of an electricity load imbalance on Vancouver Island. GSXCCC filed a report stating that until at least the year 2012, any electricity imbalance that might occur would be much smaller or would occur much later than BC Hydro asserted. The report questioned some of BC Hydro's input data, used alternative load forecasting methods in its analyses and compared the historical accuracy of some of BC Hydro's load forecasts to actual recorded data.

Shadybrook Farm submitted that the electricity demand would not be as high as forecast and that the BC Hydro peak load forecast was based on flawed assumptions. They further argued that BC Hydro unjustifiably underrated the available electricity supply. Shadybrook Farm suggested that the combination of conservation, more reasonable load forecasts and reasonable ratings of supply sources (i.e., the subsea cables) would avoid a need for the Project until at least 2011. They submitted that electricity load forecasting is critical to the GSX PL argument that there is demand for the gas on Vancouver Island and that BC Hydro forecasts of peak requirements are flawed and exaggerated.

Centra System

GSX PL's evidence indicated that Centra serves a core market of residential and commercial customers on Vancouver Island and the Sunshine Coast (93 per cent of the core market is on Vancouver Island), the industrial demand of the Vancouver Island Gas Joint Venture (VIGJV)[34] and, currently, ICP. The capacity of the existing Centra transmission pipeline can vary from 130 to 155 TJ/d, depending on the location of the load along the system. The lower capacity occurs when the load at the southern end of the system in the Victoria area is high due to seasonal heating demand, and represents the system capacity on a design peak day. In 2001, Centra's peak day throughput was 139 TJ and its forecast peak day demand was 177 TJ.[35] By 2004, Centra's peak day demand was forecast to be about 186 TJ/d (not including VIGP). The main assumption employed in the natural gas forecast is that peak firm gas demands by the core market, VIGJV, and ICP are coincident. Since the core gas demand is primarily a heating load, the coincident peak demand is expected to occur in the winter period.

---

[33] "Retirement" within GSX PL's application referred to the cables in question being assessed a capacity rating of 0 MW from a system planning perspective only. The cables might be kept available for emergency or opportunity service for some time thereafter.

[34] VIGJV comprises seven large pulp and paper mills located on the Sunshine Coast and Vancouver Island.

GSX PL submitted that the ICP is currently being supplied with gas via the Centra system, pursuant to a short-term agreement between Centra and BC Hydro. The agreement provides 38 TJ/d of firm and 7 TJ/d of interruptible transportation service to BC Hydro. This was increased from 28 TJ/d after Centra installed a temporary compressor on Texada Island and the additional wheeling capacity that BC Hydro holds on the BC Gas Coastal Transmission System was assigned to Centra. Of the 38 TJ/d of firm transportation service, 28 TJ/d is subject to curtailment on short notice when the capacity is required by Centra to meet the demands of residential and commercial markets. Centra can curtail gas supply for no more than 240 hours over a continuous 12 month period. No such curtailment has happened to date. Under an agreement with Calpine Canada (Calpine), the owner of ICP, BC Hydro can require Calpine to burn an alternate fuel for exactly the same time period as that covered by the peaking agreement. The technology for the alternate means of running ICP is not yet in place.

GSX PL submitted that ICP can only be served by Centra for a short period of time. As the core load on the Centra system grows, its existing capacity will become increasingly dedicated to the core load and the interruptions to service to BC Hydro under its Transportation Service Agreement would become significant. BC Hydro has a 20 year obligation to supply gas to ICP. Given the forecast growth in Centra's core market, capacity on the existing Centra pipeline will not be available for the 20 year period required by ICP, unless Centra is upgraded.

SPEC/DSF questioned whether ICP represented an unmet market need that necessitated the construction of the proposed Pipeline. In approving the peaking agreement, the BCUC determined that Centra had sufficient firm capacity to supply ICP with 38 TJ/d. Since its construction, ICP has drawn all of its gas supply from Centra and has never experienced curtailment. SPEC/DSF submitted that ICP therefore does not actually depend on the proposed Pipeline, so the only real value added by the pipeline would be another 45 TJ/d to Vancouver Island to supply VIGP. SPEC/DSF pointed out that BC Hydro witnesses for GSX PL had stated that BC Hydro would be looking at other options for ICP if the proposed Pipeline is not approved. Therefore, according to SPEC/DSF, ICP does not meet the test of unmet market demand. SPEC/DSF submitted that Centra has prepared preliminary plans to expand its capacity to meet future growth in the core market and that a Centra expansion would not require the construction of any new segments of marine pipeline.

NorskeCanada

In February, 2003, GSX PL advised the Panel of a "high level concept" involving on-site gas-fired and other thermal generation and energy efficiency improvements that might be able to reduce NorskeCanada's electric energy demand on Vancouver Island from BC Hydro by

---

[35] GSX PL response to the Panel's IR 5.1 based on information filed with the BCUC by Centra in June 2001in connection with BCUC Order G-53-01

200 to 250 MW. Also, an additional 50 to 75 MW of demand reductions could occur if additional gas was made available to Vancouver Island via the proposed Pipeline or if distillate was used as a fuel source. GSX PL stated that an early assessment of the NorskeCanada concept indicated that approximately a quarter of the proposal's elements were already included in BC Hydro's planned Power Smart targets for Vancouver Island. GSX PL noted that, assuming that the NorskeCanada concept is accepted and could be implemented, it would complement the VIGP rather than replace it. NorskeCanada submitted that its opportunities to generate or conserve electricity do not rely upon the proposed Pipeline. However, NorskeCanada did not take a position on whether the pipeline is necessary or whether VIGP would eventually be required.

5.3.2 Price of Natural Gas

Consumers Association of Canada *et al* (CAC BC) submitted that BC Hydro had failed to demonstrate that it has taken natural gas prices into account in determining whether or not a natural gas pipeline is a responsible choice. It submitted that BC Hydro does not care how high the price of natural gas might go, or whether using natural gas for electrical generation remains a competitive alternative. CAC BC suggested that if postage stamp rates for electricity were eliminated and Vancouver Island became reliant on fossil fuel energy, Vancouver Island residents would bear the cost of increasing gas prices.

GSXCCC submitted that the proposed Pipeline and Vancouver Island electrical generation projects had initially been developed at a time when the proponent assumed a long-term levelized price of natural gas of about US $2.00/MMBtu. GSXCCC submitted that, although this assumed price was the benchmark against which GSX PL measured the cost-effectiveness of other electrical generation and transmission methods, GSX PL's position was that the economic feasibility of the proposed Pipeline was not affected at all by any change in the long-term levelized price of natural gas. GSXCCC submitted that it is obvious that the levelized price of natural gas sourced at the Sumas/Huntingdon hub has a significant effect on the economic feasibility of the proposed VIGP. If the levelized price of natural gas goes up substantially, then the portfolio of incremental electricity generation sources will shift away from gas-fired sources in favour of other sources.

GSX PL submitted that BC Hydro would have to generate incremental electricity for Vancouver Island from exactly the same portfolio of electricity sources regardless of whether the high voltage direct current (HVDC) system is replaced by a gas pipeline or by an electrical cable. Incremental generation would be fueled by natural gas because gas-fired generation is probably the least costly way of meeting the demand at the load centres in either the Lower Mainland or Vancouver Island. If the price of natural gas increases, leading to an increase in the price of electricity, the increase in electricity rates would be province-wide and not just borne by Vancouver Island residents. Since additional gas-fired generation would be required regardless of where it was located, the forecast price of gas is not determinative in assessing the benefits of generation on Vancouver Island. GSX PL further argued that the price of natural gas would not affect the demand charges on the pipeline that Powerex has committed to pay over a 30 year period.

5.3.3 Public Versus Private Risk

A number of intervenors such as GSXCCC, Shadybrook Farm and Ms. McLennan argued that the proof of economic feasibility ought to be different for public projects than for private projects. They submitted that BC Hydro is a publicly-owned company and so the Panel should play a stronger supervisory role over the Project than it might if it were a private sector company sponsoring the Project. The financial risk of the Project would be borne by Crown corporations and by the customers of a public electric utility. The level of assurance that could be taken from an independent company's decision to risk its shareholders' interests in making financial commitments cannot be taken from Powerex's commitment. Moreover, Ms. McLennan suggested that the precedent agreement between GSX PL and Powerex is not strong evidence of the need for the proposed Pipeline because it was not entered into through an arm's length relationship.

GSX PL stated that it is not relying solely on the Powerex contract as evidence of the economic feasibility of the proposed Pipeline but is also relying on evidence of long-term supply and long-term demand. According to GSX PL, BC Hydro would not just be paying itself since Williams is involved as a 50 per cent owner of the overall Georgia Strait Crossing Project. Powerex is also paying Williams, a third party, private-sector company.

Views of the Panel

The Panel notes that many of the intervenors' concerns summarized in this chapter relate to matters that fall within the responsibility of the provincial government or provincial regulators. This Panel does not have the authority to regulate electricity within BC. The Panel's mandate is to consider whether the proposed Pipeline is in the public convenience and necessity in light of all of the evidence that is before it. The Panel has taken into consideration the matters raised by intervenors where they are relevant to this determination.

The Panel is of the view that regardless of the extent and timing of the projected growth in demand for electricity on Vancouver Island, the planned retirement of the subsea cables will clearly result in a need for another source of electricity. Additional gas-fired generation facilities on Vancouver Island would require additional natural gas transportation capacity. The Panel notes that Centra is currently supplying ICP with gas through a short-term agreement and that the supply is subject to curtailment. Should the proposed Pipeline and VIGP be approved, the gas for ICP would flow to Vancouver Island through the proposed Pipeline rather than via the Centra system. ICP and VIGP together would ensure that there would be sufficient demand on Vancouver Island for the gas shipped on the proposed Pipeline.

The Panel is aware that the BCUC denied VIEC's application, dated 12 March 2003, for a Certificate of Public Convenience and Necessity for VIGP. A public hearing took place from 16 June to 3 July 2003 in

Nanaimo and Vancouver, BC. In its Decision, dated 8 September 2003, the BCUC found that VIEC had not established that VIGP was the most cost-effective means to reliably meet Vancouver Island power needs. BC Hydro was encouraged to proceed with a call for tenders process and, if VIGP is found to be the most cost-effective alternative, the BCUC stated that BC Hydro could reapply for a Certificate of Public Convenience and Necessity. The BCUC stated that it was prepared to consider any future application for a Certificate of Public Convenience and Necessity on an expedited basis based on the results of the call for tender.

The evidence before this Panel is that the VIGP would constitute approximately half of the present market for gas on the proposed Pipeline. The Panel will include a certificate condition requiring GSX PL to provide evidence that the VIGP has received regulatory approvals before it could commence construction of the proposed Pipeline. Such a condition would ensure that there is an adequate market for the gas to be transported on the proposed Pipeline. This condition will also mean that GSX PL will not be able to construct the proposed Pipeline unless the VIGP is approved by the appropriate provincial regulatory authorities.

Based on the evidence before it, the Panel is of the view that ICP, and VIGP if it is eventually approved, would be viable over the long term and would be a continuing source of demand for the gas shipped on the proposed Pipeline over its lifetime.

Finally, with respect to the issue of the price of natural gas, the Panel notes that there was no consensus as to the level of North American natural gas prices over the life of the proposed Pipeline. While high gas prices will have some effect on the cost of electricity in BC, the magnitude and nature of this effect cannot be predicted easily. The decision as to whether BC Hydro should rely on gas-fired generation facilities or other sources of electricity and, if gas-fired, which facilities, is a provincial issue and is not a matter for this Panel to determine. However, the Panel is satisfied that, if VIGP is approved and built, it would continue to require gas from the proposed Pipeline irrespective of fluctuations in the price of the gas. The gas prices would have no effect on the demand charges for the proposed Pipeline since Powerex is committed to pay the demand charges over a 30 year period, regardless of the price of the gas it is shipping.

5.4 Conclusion

In this chapter, the Panel has considered the availability of gas to the proposed Pipeline and the existence of markets on Vancouver Island. The Panel has determined that there will be adequate gas supply for the pipeline over the long term. The Panel is further satisfied that there is adequate demand for the gas, should VIGP be approved and constructed. As noted above, a certificate condition will be included, requiring GSX PL to provide evidence that VIGP has received regulatory approvals, in order to ensure that there will be an adequate market for the gas before the proposed Pipeline is constructed. (Refer to Condition 7 in Appendix III of these Reasons.)

The Panel is of the view that, if this condition is met, the proposed Pipeline is likely to be used at a reasonable level over its economic life and the demand charges are likely to be paid. The Panel is therefore of the view that the proposed Pipeline is economically feasible.

Chapter 6

Subsea Cables

6.1 Background

There are presently three subsea cable systems between the BC mainland and Vancouver Island: the 500 kV Cheekye-Dunsmuir system; HVDC Poles 1 and 2; and the 138 kV system. GSX PL stated that the HVDC cable systems are aged and that BC Hydro's position is that they are approaching the end of their service life. GSX PL also indicated that BC Hydro already considers the 138 kV system "retired", which means that the cables have been assigned a capacity rating of 0 MW from a system planning perspective.

As noted in Chapter 5, BC Hydro has projected an electricity load-supply imbalance on Vancouver Island for some time. The initial plan to address this predicted imbalance included the refurbishment or replacement of some of the subsea cable systems. While the earliest plans involving cables were based upon refurbishment of its existing HVDC facilities, BC Hydro subsequently determined that in the event the cable options were to be pursued, it would replace these facilities with new 230 kV alternating current cables.

The plan to refurbish the cables was changed when the BC government directed BC Hydro to enter into Power Purchase Agreements with two private power developers on Vancouver Island, both of whom were proposing to generate electricity locally on the Island using natural gas. The directive led BC Hydro to develop the proposed Pipeline as an alternative to the replacement or upgrading of the cable systems. As a result of the development of the proposed Pipeline, BC Hydro no longer considered the subsea cable replacement or refurbishment alternatives, beyond normal and ongoing system planning activities. GSX PL witnesses from BC Hydro testified during the oral hearing that it was now fully committed to the proposed Pipeline and considered it the superior alternative to any of the subsea cable or other options.

At the request of some intervenors, including CAC BC, GSX PL provided BC Hydro's estimated cost figures for an upgrade to the cable system. GSX PL provided the figures as planning alternative estimates only because no such projects were being developed in light of BC Hydro's commitment to the VIGP/Georgia Strait Crossing Project option. GSX PL also noted that the cost figures it provided for the cable upgrades would have to be augmented by additional costs that would be incurred in bringing such a cable system into service. It noted, for example, that additional costs would be incurred for system improvements to the BC Hydro bulk transmission network in order to add the 230 kV cables in a safe and effective manner. GSX PL also asserted that any sunk costs incurred to date for the VIGP/Georgia Strait Crossing Project would be assessed against a 230 kV cable project.

SPEC/DSF, GSXCCC, Shadybrook Farm and others questioned the wisdom of the policy decision to proceed with the pipeline option instead of the initial plan to improve the cable system. They asserted that the cables were the preferred option from a number of perspectives and questioned BC Hydro's cost estimates for the cable system. Shadybrook Farm submitted that BC Hydro's assertion of the need for the VIGP/Georgia Strait Crossing Project was based on flawed assumptions and that BC Hydro unjustifiably underrated available electricity supply. These intervenors submitted that a combination of conservation, reasonable load forecasts and reasonable ratings of supply sources (i.e., the subsea cables) would avoid a need for the Project until at least 2011. They also disputed BC Hydro figures, methodologies and conclusions with respect to the cost comparison of VIGP/Georgia Strait Crossing Project to the cable alternative.

SPEC/DSF submitted that the subsea cable alternative is an economically and technically viable alternative to the proposed Pipeline. The projected gap in time until the new electricity supply via the cables could come onstream could be bridged by short-term measures already contemplated by BC Hydro. Additionally, the proposed conservation and generation proposals like that of NorskeCanada could assist in bridging the gap.

6.2 Relevance of the Evidence on the Subsea Cables

GSX PL argued that the evidence on the subsea cables was not relevant under the NEB Act. GSX PL submitted that the role of the Panel is not to decide the future electricity requirements for Vancouver Island since that is a provincial matter. GSX PL submitted that its application is for a gas pipeline project, not an electricity project, and that evidence on the subsea cables is not helpful or relevant to the determination of whether the proposed Pipeline should be approved under section 52 of the NEB Act. The BC Department of Energy and Mines also took the position that the subsea cables would only be relevant to the Panel's determination if the mandate of the Panel were to assess the means of getting electricity to Vancouver Island. However, it submitted, this issue falls within the mandate of the Province, not this Panel. Since the Panel has no authority to implement a recommendation regarding the cables option, evidence in this regard should not be considered in the determination of the application. The Province argued that in the alternative, should the subsea cables be considered relevant, they should be given little weight.

A number of intervenors submitted that the evidence on the subsea cables is relevant and must be fully considered by the Panel. They submitted that the Panel should recognize that the purpose of the Project is the provision of electricity to Vancouver Island. They pointed out that there is no market for the gas from the proposed Pipeline other than the one existing, and the one proposed, gas-fired generation facility on Vancouver Island. Some noted that BC Hydro officials testified that the Provincial government directed BC Hydro to pursue gas-fired generation on the Island and a gas pipeline as an alternative to the subsea cables. If the purpose and need for the Project are defined as the provision of electricity for Vancouver Island, the intervenors submitted, it is incumbent on the Panel to compare the merits of the proposed Pipeline and an upgrade to the subsea cable system as a means of providing electricity to Vancouver Island. This would involve a comparison between the two options of the proposed Pipeline and the subsea cables in economic, social and environmental terms. GSXCCC also submitted that the CEA Act must inform the Panel's decision under section 52 of the NEB Act and that the CEA Act and the 2001 Agreement between the Minister of the Environment and the NEB have the legal effect of requiring the Panel to consider "need, purpose and alternatives to" under section 52 and to compare the relative costs and benefits of the two options.

Views of the Panel

Section 52 of the NEB Act conveys a broad discretion on the NEB to have regard to all considerations that appear to it to be relevant. In addition, under paragraph (e) of that section, the decision-maker can consider any public interest that in the NEB's opinion may be affected by the granting or the refusing of the application. There are two ways in which information can be relevant to the determination under section 52 of the NEB Act. First, it is relevant if it is a matter that pertains to the application under section 52 and is a matter over which the Panel has regulatory control. Second, it can be relevant if it is a matter that would be useful to the Panel in making its determination under section 52 of the NEB Act but is a matter over which the Panel cannot exert regulatory control.

The Panel determined in its 20 January 2003 ruling that other ways of meeting the need for electricity on Vancouver Island, such as wind, solar and tidal power were not relevant to its determination under section 52 of the NEB Act because this information did not have a sufficient connection or nexus to the application before the Panel and would not inform its decision. The Panel also ruled at that time that the situation in relation to the replacement or refurbishment of the existing electrical subsea cables might be different and reserved its judgment on the relevance of evidence on the cables to its ultimate determination under section 52 of the NEB Act.

The first heading of relevancy states that evidence can be relevant if it is a matter that pertains to the application under section 52 of the NEB Act and is a matter over which the Panel has regulatory control. The Panel does not have the mandate to regulate electricity matters in BC. The Panel does not have statutory authority under the NEB Act to direct that the subsea cable system be refurbished, nor can it determine the best method for ensuring the provision of reliable electricity to the residents of Vancouver Island. That is a matter for the Province of BC to determine as part of its overall energy policy. Since the Panel does not exert regulatory control over the subsea cables, the subsea cables are not relevant under this heading of relevancy.

The second heading of relevancy states that the evidence can be relevant if it is useful to the Panel in considering whether the Project is in the public convenience and necessity. If the information in question has sufficient connection or proximity to the application under consideration, it can be relevant to the determination to be made by the Panel. It is not open to a decision-maker to base its decision on irrelevant information; there should be a degree of connection between a decision-making power and the matters taken into consideration when exercising that power.

The Panel is not persuaded by the arguments of GSX PL and the Provinces of BC and Alberta that the subsea cables are completely irrelevant to its determination under section 52 of the NEB Act. The Applicant affirmed in its evidence that an upgrade to the subsea cable system was considered by BC Hydro as an option before it decided to pursue the proposed Pipeline application. The subsea cable system is presently being used to provide electricity to Vancouver Island and the evidence of GSX PL is that if and when the cables are decommissioned, the gap will be filled by the Georgia Strait Crossing Project which will supply gas to the two electricity generation facilities. There is, to this extent, a degree of connection between the subsea cables and the applied-for project that was acknowledged by the Applicant in its evidence. As a result, the Panel is of the view that evidence in relation to the subsea cable system has sufficient proximity to the application before it that it is relevant to its overall determination of public convenience and necessity under the NEB Act.

Under section 52 of the NEB Act, the NEB must decide if it will approve or deny an application for a proposed pipeline project. As part of its consideration of the public convenience and necessity test under that section, the NEB considers the benefits and burdens of a proposed project and can deny the project if it decides that the burdens outweigh the benefits. The significance of the ultimate consequences of either a denial or an approval of a proposed pipeline project can vary and those consequences can affect the way in which the NEB weighs the benefits and the burdens of the project. For example, the NEB could determine that the negative consequences that would ultimately flow from a denial of an application are sufficient to render acceptable an otherwise unacceptable socio-economic or environmental effect of pipeline construction.

The Panel has considered that if it were to deny this Application, the implications of the denial would be that the VIGP would probably not be built because there would not be the necessary natural gas available for the generation of electricity by that plant. However, the evidence on the record is that there would be alternative ways, primarily via the subsea cables but possibly in other ways as well, to ensure that sufficient electricity would be available on Vancouver Island. As a result, the Panel has determined that the consequences of a denial of the Project would not be as drastic as they would be if the proposed Pipeline and VIGP were the only way to provide electricity to Vancouver Island.

The question of whether the cables would be the best way to deliver electricity to Vancouver Island is something that, in the Panel's view, warrants consideration by the appropriate provincial authorities. The Panel does not have the authority to make such a determination and therefore cannot consider the evidence on the cables to be relevant as pertaining to a matter over which the Panel has regulatory control.

In conclusion, the Panel has taken the evidence on the subsea cable system into account in weighing the benefits and the burdens of the applied-for Project as part of its decision regarding the public convenience and necessity pursuant to section 52 of the NEB Act. The Panel's overall determination of the public convenience and necessity is set out in the next chapter.

Chapter 7

Overall Conclusion and Disposition

7.1 Conclusion on Public Convenience and Necessity

Under section 52 of the NEB Act, the Panel must determine whether it is in the public convenience and necessity to issue a certificate to construct and operate the proposed Pipeline. There is no specific test that must be applied to determine when it is in the public convenience and necessity to issue a certificate; all of the relevant evidence and the particular facts must be considered in each case in order for a Panel to make a determination. In the preceding chapters, the Panel made findings on individual matters that fall within the ambit of section 52 of the NEB Act. In making its overall determination on the public convenience and necessity, the Panel carefully considered all of the evidence outlined in these Reasons. The Panel is of the view that, having weighed the benefits and burdens of this Application, it is in the public convenience and necessity to grant a certificate pursuant to section 52 of the NEB Act for the proposed Pipeline.

7.2 Disposition

This and the foregoing chapters constitute our Reasons for Decision in respect of the Application heard by the Panel in this proceeding.

The Panel is satisfied that the proposed Pipeline is, and will be required by the present and future public convenience and necessity, provided the terms and conditions outlined in Appendix III of these Reasons are met. Therefore, subject to the approval of the Governor in Council, a Certificate of Public Convenience and Necessity will be issued pursuant to Part III of the NEB Act.

Elizabeth Quarshie
Presiding Member

Rowland J. Harrison
Member

The Honourable Bryan Williams, Q.C.
Member

Calgary, Alberta
November 2003

Appendix I

Summary of Events

Following the filing of a preliminary submission by GSX PL on 7 March 2000, the NEB solicited public comments on the environmental assessment and regulatory review process and hosted public information sessions in Duncan and Sidney, BC, on 26 and 27 June 2000. Subsequent public information sessions were held on North Pender Island, Saltspring Island and Saturna Island, BC from 18 to 20 July 2000. Information sessions were held with the Tsawout, Tsartlip and Penelakut First Nations and the Cowichan Tribes from 8 to 10 August 2000.

On 4 October 2000, the Minister of the Environment, the Honourable David Anderson, pursuant to his authority under the CEA Act, announced that the Project would be sent to an independent environmental assessment review panel.

On 24 April 2001, GSX PL filed its Application for a Certificate of Public Convenience and Necessity pursuant to section 52 of the NEB Act.

A draft agreement between the NEB and the Minister of the Environment concerning the review of the the Project was released for public discussion and comment in May 2001. The primary purpose of the Agreement was to coordinate the environmental assessment required under the CEA Act and the NEB Act by providing for a review of the environmental effects likely to result from the Project and the appropriate mitigation measures.

The Agreement was finalized and released on 20 September 2001 when the independent Joint Review Panel was appointed. The members were Ms. Elizabeth Quarshie (Presiding Member), Mr. Rowland J. Harrison, and the Honourable Bryan Williams, Q.C. The mandate of the Panel was to act as a joint review panel under the CEA Act to make recommendations to the Minister of the Environment and as a NEB panel to consider all matters relevant to the Application for a certificate under section 52 of the NEB Act.

During the week of 22 October 2001, Panel staff hosted public information sessions in Arbutus Ridge, Saltspring Island, Sidney, Saturna Island and North Pender Island, BC. Information sessions were also offered to First Nations.

On 9 November 2001, the Panel issued the Directions on Procedure for the GH-4-2001 proceeding, which included a List of Issues and a schedule of events leading up to a 17 June 2002 oral public hearing.

The Panel hosted public consultation sessions from 11 to 18 January 2002 in Vancouver, Sidney, Arbutus Ridge, Saltspring Island, Victoria, Saturna Island and North Pender Island, BC. Two additional sessions were held specifically with respect to First Nations' issues in Sidney and Duncan, BC. By letter dated 31 January 2002, the Panel responded to the comments and concerns expressed at the consultation sessions and issued revisions to the List of Issues.

In response to comments by various parties to the GH-4-2001 proceeding, the Panel decided to seek comments on whether it had the authority under the CEA Act or the NEB Act to consider the environmental effects of the combustion of gas to be transported by the proposed Pipeline, the combustion of gas at the existing ICP facility at Campbell River, BC or the combustion of gas at the proposed new VIGP facility at Duke Point, near Nanaimo, BC and, if the Panel had the authority, whether it should consider these effects. A timetable for submissions was established and oral argument was heard in Sidney, BC on 9 and 10 April 2002. In its decision, dated 31 May 2002, the Panel revised the List of Issues for the GH-4-2001 proceeding to include a consideration under the NEB Act of "the environmental effects of the combustion of gas at the proposed new generation facility, being considered for Duke Point on Vancouver Island". (Refer to Appendix II - List of Issues.)

Also on 31 May 2002, following the receipt of comments on the practicality of meeting the planned hearing schedule considering the status of Crown consultation activities with First Nations, the Panel issued a revised schedule for the proceeding. The Panel did not set a date for the oral hearing, stating it would determine whether and when to set the Application down for hearing after a further round of comments on the adequacy of Crown consultation activities.

In response to motions by several Parties to compel GSX PL to provide answers to various information requests, the Panel stated, in a letter decision dated 26 September 2002, that "other than those involving the transportation of gas to Vancouver Island, the only "alternative to" that it will consider is the refurbishment or replacement of the existing subsea cable system, and it will be considered under the *Canadian Environmental Assessment Act*." On 18 October 2002 the Panel released the reasons for its 26 September 2002 decision, specifically addressing the issues of alternatives to the project and the environmental effects of GHG emissions. These reasons were subsequently revised on 20 January 2003.

A facilitated pre-hearing technical conference was held in Sidney, BC on 14 and 15 November 2002 to narrow scientific differences on specific marine issues. The conference was attended by scientific and technical experts, intervenors in the proceeding, government agencies, the Applicant and Panel staff. Working sessions were held on benthic fauna, benthic flora, barriers and marine mammals. The Panel released the conference facilitator's report on 2 December 2002.

On 13 January 2003, following the receipt of comments on whether the Application was ready to be set down for oral hearing, the Panel announced that the hearing would commence on 24 February 2003. Also on 13 January 2003, following motions by Ms. McLennan and GSXCCC, the Panel announced that it had decided not to vary its 26 September 2002 decision regarding which IRs GSX PL should answer. However, the Panel did decide to vary its reasons for that decision. The revised reasons were released on 20 January 2003.

A public information session was held prior to the hearing, near Sidney, BC, on 23 February 2003. The hearing took place from 24 February to 19 March 2003 at the Mary Winspear Community Cultural Centre in Sidney, BC.

On 4 June 2003 GSXCCC filed a notice of motion seeking the inclusion on the record of evidence filed by Terasen (formerly Centra). This evidence related to the expansion of the existing Centra natural gas pipeline to Vancouver Island in substitution for the proposed Pipeline. The Panel heard oral argument on 23 June 2003 in Nanaimo, BC and released its Decision, denying GSXCCC's motion, on 8 July 2003.

The JRP Report was released by the Panel on 30 July 2003. The government response to the JRP Report was approved by the Governor in Council, and released on 21 November 2003.

Appendix II

List of Issues

1. The economic feasibility of the proposed GSX Canada Pipeline having regard to, among other things:

    - the outlook for long-term demand for natural gas in the markets proposed to be served by the proposed pipeline;
    - the outlook for the long-term supply of natural gas available to be transported on the proposed pipeline;
    - the ability of the proposed GSX Canada Pipeline Project to attract volumes to its system over the long term; and
    - project financing with reference to the corporate structure of the Applicant and financial arrangements with related parties.

2. The potential environmental and socio-economic effects of the proposed GSX Canada Pipeline Project including those factors set out in subsections 16(1) and 16(2) of the Canadian Environmental Assessment Act as described below:

    - the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
    - the significance of the effects referred to in the paragraph above;
    - comments from the public that are received during the review;
    - measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
    - the purpose of the Project;
    - alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
    - the need for, and the requirements of, any follow-up program in respect of the Project;
    - the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of the future;
    - need for the Project;
    - alternatives to the Project;
    - a description of the present environment which may reasonably be expected to be affected, directly or indirectly, by the Project, including adequate baseline characterization;

- measures to enhance any beneficial environmental effects; and
- proposal for contingency and emergency response plans.

3. The potential impact on landowners and communities affected by the selected route of the proposed pipeline, including:
    - the potential impact of the 30 m safety zone; and
    - the potential impact on farming operations.
4. The appropriateness of the routing and location of the proposed facilities, land requirements and land rights acquisition process.
5. The safety of the design, construction, operation and emergency response planning for the proposed Project, including the potential for the occurrence of and consequences of failures, malfunctions or accidents.
6. The reasonableness of the proposed tolling methodology.
7. The terms and conditions to be included in any certificate which may be granted.
8. The adequacy of consultation with First Nations regarding the proposed Project.
9. The potential impact of the proposed Project on First Nation communities, traditional use activities, and their treaty and aboriginal interests.
10. The ability of the Applicant to manage risk and financial liabilities related to the construction, operation, and decommissioning of the Project, and pipeline failures, malfunctions or accidents.
11. The environmental effects of the combustion of gas at the proposed new generation facility, being considered for Duke Point on Vancouver Island.

Appendix III

Certificate Conditions and Concordance Table

General

1. Unless the Board otherwise directs, GSX PL shall cause the approved facilities to be designed, manufactured, located, constructed, installed and operated in accordance with those specifications, drawings, schedules, and other information or data set forth in its Application or as otherwise adduced in evidence before the Panel during the GH-4-2001 proceeding.

2. Unless the Board otherwise directs, GSX PL shall implement or cause to be implemented all of the policies, practices, recommendations, procedures, and commitments for the protection of the environment and the promotion of safety referred to in its application, or as otherwise adduced in evidence before the Panel during the GH-4-2001 proceeding.

3. GSX PL shall maintain at its construction office(s):

   (a) copies of any permits, approvals or authorizations for the applied-for facilities issued by federal, provincial or other permitting agencies, which include environmental conditions or site-specific mitigative or monitoring measures; and

   (b) any subsequent variations to any permits, approvals or authorizations.

4. GSX PL shall, within 60 days of the issuance of this Certificate or within a time otherwise directed by the Board, engage an independent third party approved by the Board as a Verification Technical Authority for the marine segment of the pipeline.

   (a) A Verification Technical Authority is a company or firm that, to the satisfaction of the Board, is free of any conflict of interest with the Georgia Strait Crossing Project or the proponents of the Georgia Strait Crossing Project and is an expert in the design, construction, and operation of marine pipelines including the verification of pipeline materials, line pipe manufacture, system testing and facility commissioning.

   (b) The Verification Technical Authority shall:

      (i) independently develop, and provide directly to the Board, expert technical analysis, reports, opinions, advice and recommendations pursuant to the approved scope of work described in subsection (c);

      (ii) complete all duties, obligations, responsibilities and activities pursuant to the approved scope of work described in subsection (c); and

      (iii) report to the Board in a timely manner any violations of subsections (d).

(c) GSX PL shall provide, for the approval of the Board, a scope of work that describes the activities to be completed by the Verification Technical Authority. The scope of work shall include an assessment of the management system. The scope of work shall be comprehensive and focused on the structural integrity and reliability of the marine pipeline. It should specify activities necessary to facilitate the examination of the accuracy and correctness of the project design standard, design scenarios, risks, design criteria, load and response calculation methods and results, and the specifications and design drawings. The scope should also include elements necessary to verify that materials, pipe, components, construction and testing have been conducted and completed in compliance with the project standards, approved specifications and designs, and regulatory requirements.

(d) GSX PL shall grant and facilitate access of the Verification Technical Authority to all information, data, and materials to enable it to complete every duty pursuant to the approved scope of work.

(e) The Board may withdraw its approval of the Verification Technical Authority if it deems that the approved Verification Technical Authority:

(i) no longer meets the definition of section (a); or

(ii) is not in compliance with any part of section (b).

Prior to the Commencement of Construction

5. GSX PL shall file with the Board for approval:

(a) at least 30 days prior to the commencement of clearing of vegetation or ground-breaking activities or within a time otherwise directed by the Board, a joining program that addresses the joining of the terrestrial pipe and components pursuant to section 16 of OPR-99; and

(b) at least 30 days prior to the commencement of marine pipe lay operations or within a time otherwise directed by the Board, a joining program that addresses the joining of the marine pipe and components pursuant to section 16 of OPR-99.

6. Unless the Board otherwise directs, GSX PL shall, prior to the commencement of clearing of vegetation, ground-breaking activities or marine pipe lay operations, whichever comes first, demonstrate to the Board's satisfaction that, in respect of the transportation of firm volumes on the GSX Canada Pipeline, firm transportation contracts have been executed for the subscribed capacity (i.e., 100 970 GJ/d).

7. GSX PL shall, prior to the commencement of clearing of vegetation, ground-breaking activities or marine pipe lay operations, whichever comes first, confirm that regulatory approvals for the Vancouver Island Generation Project (VIGP) have been obtained and file a letter from an officer of BC Hydro with the Board stating that the company intends to construct that facility and the date construction is scheduled to commence.

8. GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities or within a time otherwise directed by the Board, a heritage resource impact assessment, including any additional mitigation measures, for the portions of the right-of-way previously not surveyed. The filing shall also include any comments and recommendations on this assessment and proposed mitigation from the British Columbia Ministry of Sustainable Resource Management, Archeology Branch and a statement on whether GSX [illegible] intends to implement the recommendations.

9. GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of horizontal directional drill (HDD) operations or marine pipe lay operations, whichever is sooner, or within a time otherwise directed by the Board, any comments and recommendations on the underwater archeological assessment and the proposed mitigation from the British Columbia Ministry of Sustainable Resource Management, Archeology Branch and a statement on whether GSX PL intends to implement the recommendations.

10. GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, the qualifications and experience of the Environmental Inspectors and Soil Specialist(s) who will be used on the Project.

11. GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, a detailed outline of information related to environmental protection measures that will be presented to all field personnel during a project-specific environmental training program.

12. GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, updated copies of its Marine, Terrestrial, and Landfall Environmental Protection and Reclamation Plans (EPRPs) and Environmental Alignment Sheets that include all environmental commitments and site-specific mitigative measures in respect of the Application and a statement on whether GSX PL intends to implement the commitments and measures.

13. Unless the Board otherwise directs, should the jetting construction method be considered for the marine portion of the pipeline, GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, the results of a specific sediment sampling plan for areas of the pipeline considered for installation using the jetting construction method. This report shall include:

(a) a detailed statistically valid sampling protocol;

(b) the results of the sediment sampling plan, indicating whether sediment in excess of Environment Canada's (2000) Interim Contaminant Testing Guidelines is discovered;

(c) all mitigative measures GSX PL would implement should it be found that sediment in excess of Environment Canada's (2000) Interim Contaminant Testing Guidelines exists in the area that could be affected by the project;

(d) copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan and mitigative measures with appropriate regulatory agencies, including Environment Canada and Fisheries and Oceans Canada; and

(e) criteria to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation.

14. Unless the Board otherwise directs, GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a detailed pre- and post-construction monitoring and follow-up program. The program shall include scientifically rigorous criteria to be used to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation developed for benthic flora and fauna along Cape Keppel near Ecological Reserve 67. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan with appropriate regulatory agencies, including Fisheries and Oceans Canada, shall be provided. The follow-up program shall include a schedule for filing reports to the Board.

15. Unless the Board otherwise directs, GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a follow-up program on barrier effects. The follow-up program shall include:

(a) a schedule for filing subsequent reports with the Board which verify the accuracy of the environmental assessment predictions and assess the effectiveness of the mitigation developed for reducing barrier effects to benthic communities and include any further mitigation proposed by GSX PL;

(b) copies of all correspondence and minutes of meetings demonstrating consultation with appropriate stakeholders, including, but not limited to, Environment Canada and Fisheries and Oceans Canada, in developing the follow-up program;

(c) a detailed approach to ensure that, in areas where the pipeline is trenched, a minimum of 50 per cent of its diameter for no less than 50 per cent of each 100 m linear section will be buried; and

(d) an outline and schedule of the reports to be submitted on the results of year 1, 2, 3 and 5 post-construction crab trapping and tagging studies, and year 7 if deemed necessary by Fisheries and Oceans Canada. The reports shall include any further mitigation proposed by GSX PL.

16. Unless the Board otherwise directs, GSX PL shall file with the Board, at least 21 days prior to the commencement of clearing of vegetation or ground-breaking activities, the results of an additional detailed breeding bird survey to determine the presence of active nests of breeding birds within 100 m of areas to be disturbed during construction. Where active nests of breeding birds are observed, GSX PL shall also file a detailed mitigation plan for approval, including copies of all correspondence and minutes of meetings demonstrating consultation with appropriate regulatory agencies, including Environment Canada, in developing the plan.

17. Unless the Board otherwise directs, GSX PL shall file with the Board, at least 21 days prior to the commencement of clearing of vegetation or ground-breaking activities, the methodology and results of a pre-construction survey for federally and provincially listed plant species of concern along the entire terrestrial portion of the right-of-way. Where plant species of concern could be affected by construction activities, GSX PL shall also file a detailed mitigation plan for approval, including copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan with appropriate regulatory agencies, including Environment Canada.

18. Unless the Board otherwise directs, GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a follow-up program to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation developed for snow-white rein orchid, slender woolly heads, California-tea, and any other federally and provincially listed plant species of concern discovered during the pre-construction surveys. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the program with appropriate regulatory agencies, including Environment Canada, shall be provided. The follow-up program shall include a schedule for filing reports with the Board.

19. Unless the Board otherwise directs, GSX PL shall file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a follow-up program to verify the accuracy of the environmental assessment predictions in relation to reef effects. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the program with appropriate regulatory agencies, including Environment Canada and Fisheries and Oceans Canada, shall be provided. The follow-up program shall include a schedule for filing reports to the Board.

20. Unless the Board otherwise directs, GSX PL shall complete all outstanding pre-construction surveys, not referenced in any other condition, for the terrestrial and marine portions of the pipeline as committed to during the GH-4-2001 proceeding and file the results with the Board for approval 60 days prior to the commencement of construction, including clearing or ground-breaking activities and marine pipe lay operations. The filing shall identify any potential adverse effects and any additional mitigative measures to be implemented.

21. GSX PL shall offer to conduct, for those landowners with wells located within 50 m of the pipeline right-of-way and within 300 m of blasting activities, detailed pre-construction water well analyses to acquire baseline information about water quality and well function including yield. Following completion of construction activities, GSX PL shall offer to conduct additional water well monitoring and analyses, for those landowners who agreed to pre-construction analyses, to confirm no adverse effects. If the analyses demonstrate an effect (deterioration in water quality or well yield) on a specific water well due to GSX PL's activities, it shall undertake corrective action to address any effects. GSX PL shall document and respond to any complaints received concerning water quality or well function for two years following construction. GSX PL shall file with the Board within 14 days of receiving the complaint, a summary of the issue and a discussion of its resolution, or a proposed action plan.

22. GSX PL shall offer to conduct, for those landowners with inhabited structures within 50 m of the pipeline right-of-way, detailed pre-blast structural assessments. Following construction, GSX PL shall offer to conduct post-blast structural assessments, for those landowners who agreed to pre-blast structural assessments. If the assessments demonstrate an effect on a specific inhabited structure due to GSX PL's activities, it shall undertake corrective action to address any effects. GSX PL shall document and respond to any complaints received concerning blasting effects on inhabited structures for two years following construction. GSX PL shall file with the Board within 14 days of receiving the complaint, a summary of the issue and a discussion of its resolution, or a proposed action plan.

23. Unless the Board otherwise directs, GSX PL shall file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining the plan to test groundwater encountered during excavation for sewage constituents. The report shall:

    (a) include a statement of the type of testing methodology to be used;

    (b) indicate the sewage constituents to be tested for;

    (c) include the acceptable levels of each constituent;

    (d) provide the frequency of testing; and

    (e) provide a mitigation and disposal plan for water found to exceed the acceptable limits.

24. Unless the Board otherwise directs, GSX PL shall file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining the plan to test wells 18200, 27402, 28298 and 29881 for yield and water quality prior to, during and after the HDD construction. The report shall:

    (a) include a statement of the type of testing methodology to be used;

    (b) include the acceptable water quality level and well yield;

(c) provide the frequency of testing;

(d) include the duration of testing after the HDD construction; and

(e) provide for any additional mitigative measures that would be implemented.

25. Unless the Board otherwise directs, GSX PL shall file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining a testing plan to ensure that, upon backfilling and compaction, trench backfill material has permeability properties consistent with the surrounding soils. The report shall:

(a) include pre-construction in-situ field testing;

(b) include the infiltration test procedure to be used;

(c) provide the criteria for determination of acceptable permeability range limits relative to existing conditions;

(d) provide the frequency of testing; and

(e) include a mitigation plan if permeability is found to be outside acceptable limits.

During Construction

26. Unless the Board otherwise directs, GSX PL shall file with the Board for approval, 60 days prior to initiating the horizontal directional drill (HDD) at the Manley Creek landfall, a detailed site-specific environmental management plan. The plan should:

(a) identify the potential hazards that could occur;

(b) identify all site-specific mitigation, habitat compensation, and monitoring requirements as required by Fisheries and Oceans Canada and Environment Canada;

(c) identify additional containment systems (e.g., booms and seafloor control devices) that would be used to minimize the potential for mud releases beyond the limits of the glory hole;

(d) specify that density adjustments to the drilling mud would only be made through the use of inert or non toxic materials;

(e) discuss and include any mitigation for launching the HDD pipe string and

(f) include a monitoring plan to quantify the effects of drilling mud on marine vegetation at the HDD site.

27. GSX PL shall not implement the open cut or partial HDD method as an alternative to the proposed HDD at Manley Creek until:

(a) GSX PL files with the Board detailed reasons why the HDD is not feasible or was not successful;

(b) GSX PL consults with Environment Canada and Fisheries and Oceans Canada, obtains all necessary permits and files a detailed site-specific, open cut or partial HDD crossing plan and an eelgrass monitoring plan that includes scaled drawings identifying all areas that would be disturbed by constructing the crossing; and

(c) receives written approval from the Board that an open-cut or partial HDD crossing may begin.

28. Unless the Board otherwise directs, GSX PL shall take all reasonable measures to construct the marine portion of the pipeline from October to April to minimize potential interactions with marine mammals. Should GSX PL determine that it is necessary for construction to extend beyond April, GSX PL shall file with the Board for approval at least 30 days prior to 30 April:

(a) information on the status of marine construction activities and an updated construction schedule, including the anticipated completion date;

(b) specific mitigation and monitoring plans that may be undertaken by GSX PL for construction activities outside the window; and

(c) copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan with appropriate regulatory agencies, including Fisheries and Oceans Canada.

Post-Construction

29. GSX PL shall demonstrate to the Board's satisfaction, prior to the commencement of operation, that the pipeline has been designed to maintain:

(a) operability with little or no damage for a design earthquake with a probability of exceedance of 10 per cent in 50 years; and

(b) containment of the gas for a design earthquake with a probability of exceedance of 2 per cent in 50 years.

30. Unless the Board otherwise directs, GSX PL shall file an annual report with the Board and Environment Canada starting in the year following commissioning of the Vancouver Island Generation Project (VIGP) and through the end of 2010. The report shall contain the annual greenhouse gas emissions from the Island Cogeneration Project (ICP) and VIGP and provide details of GHG emission offsets for ICP and VIGP to demonstrate compliance with the 50 per cent offset commitment made to the public by BC Hydro.

31. Unless the Board otherwise directs, GSX PL shall file a report setting out the results of its post-construction sound emission study with the Board for approval within 90 days of commencement of operation of the pipeline. The report shall include data gathered on sound emitted from the marine pipeline for the representative range of flow, pressure, compressor operating conditions and any other factor that may contribute to the sound emissions. Data should establish the level of sound emitted from the pipeline in relation to ambient noise levels and the distance this sound is propagated in the water column. Should the test results indicate that pipeline noise would be detectable to killer whales and harbour porpoises, GSX PL shall consult with Fisheries and Oceans Canada and include in the report any additional mitigation measures it plans to implement to reduce the noise level.

32. Unless the Board otherwise directs, GSX PL shall file with the Board, within six months of the date that the facilities are placed into service, and on or before the 31 January that follows each of the first, second, and third complete growing seasons, a report that:

   (a) identifies the status of any new or outstanding environmental issues for the terrestrial, landfall, and marine portion of the pipeline;

   (b) provides a description of the measures GSX PL proposes to take in respect of any new or outstanding environmental issues;

   (c) provides an assessment of the effectiveness of mitigative measures undertaken on the terrestrial, landfall, and marine pipeline right-of-way, including final-clean-up and reclamation on the terrestrial and landfall portion of the right-of-way; and

   (d) contains As-Built Alignment Sheets.

Expiration of Certificate

33. Unless the Board otherwise directs prior to 31 December 2005, this certificate shall expire on 31 December 2005 unless the construction of the approved facilities has commenced by that date.

Table A-1
Concordance between JRP Report Recommendations and Certificate Conditions

JRP Recommendation	Certificate Condition	Summary of Concern
1	20	Marine and terrestrial pre-construction surveys.
2	26	Environmental management plan for HDD
3	27	Open cut or partial HDD at Manley Creek
4	14	Environmental monitoring and follow-up at Cape Keppel
5	13	Jetting method for marine pipeline
6	19	Follow-up program on reef effects
7	15	Follow-up program on barrier effects
8	28	Construction window for marine pipeline
9	31	Operations sound emission study for marine pipeline
10	23	Groundwater testing during excavation
11	24	Water well testing near HDD at Manley Creek
12	25	Backfill permeability and compaction testing
13	21	Water well testing for effects of blasting
14	22	Pre- and post-blast structural assessments
15	10	Qualifications of inspectors and soil specialist(s)
16	17	Plant surveys for listed plant species of concern
17	18	Follow-up program for listed plant species of concern
18	16	Breeding bird surveys
19	8	Heritage resources impact assessment
20	9	Underwater archeological assessment
21	1	Adherence to information or data in the application
22	3	Copies of permits in construction office
23	2	Adherence to environmental and safety commitments
24	12	Updated EPRPs and Environmental Alignment Sheets
25	11	Environmental protection measures for field personnel
26	32	Follow-up environmental reports
-	4	Role of Verification Technical Authority
-	5	Marine Terrestrial joining programs
-	6	Executed firm transportation contracts
-	7	Regulatory approval for VIGP
-	29	Operability and containment for design earthquakes
-	30	GHG emission and offset report
-	33	Expiry of Certificate

Appendix IV

Government of Canada Response to the Joint Review Panel Report

INTRODUCTION

On July 30, 2003, the National Energy Board (NEB)/Canadian Environmental Assessment Agency Joint Review Panel (Panel) released its environmental assessment report, which contains 26 recommendations regarding the construction and operation of the GSX Canada Pipeline Project (GSX project). The Panel concluded that the GSX project is not likely to result in significant adverse environmental effects provided its recommendations are implemented and appropriate mitigation identified during the course of the review is applied.

This document outlines the Government of Canada's response to the Panel's recommendations and discusses how the Government of Canada will address these recommendations.

BACKGROUND

Georgia Strait Crossing Pipeline Limited (GSX PL) filed an application with the National Energy Board (NEB) for a Certificate of Public Convenience and Necessity under section 52 of the *National Energy Board Act (NEBA)* to construct and operate the GSX Canada Pipeline project (GSX project). The GSX project is the Canadian portion of a proposed international pipeline, referred to as the Georgia Strait Crossing Project (or GSX Pipeline), to transport natural gas from Sumas, Washington to Vancouver Island. The need for a Certificate of Public Convenience and Necessity under section 52 of the *NEBA* resulted in the requirement for an environmental assessment of the project pursuant to paragraph 5(2)(a) of the *Canadian Environmental Assessment Act* (*CEAA*). As well, subsection 35(2) *Fisheries Act* authorizations and approvals under the *Navigable Waters Protection Act* from the Minister of Fisheries and Oceans, and a Disposal at Sea permit under the *Canadian Environmental Protection Act* , 1999 from the Minister of the Environment are required. The need for any such authorizations, approvals or permits under the *Fisheries Act* , the *Navigable Waters Protection Act* , and the *Canadian Environmental Protection Act, 1999* , also results in the requirement for an environmental assessment, pursuant to paragraph 5(1)(d) of the *CEAA*.

On August 15, 2001, an agreement signed between the NEB and the Minister of the Environment provided for the assessment of the GSX project by a Joint Review Panel (Panel). The mandate of the Panel was to act as a Joint Review Panel under the *CEAA* to make recommendations to the Minister of the Environment and as an NEB Panel under the *NEBA* to consider all matters relevant to the application for a Certificate, under section 52. Under the *CEAA* , the Panel was charged with reviewing the environmental effects of the GSX project and the appropriateness of mitigation measures as well as the preparation of a report setting out its rationale, conclusions and recommendations, including any mitigation measures and follow-up programs.

The Panel, in its report released on July 30, 2003, concluded that the GSX project is not likely to result in significant adverse environmental effects provided its recommendations are implemented and appropriate mitigation identified during the course of the joint review is applied. The Panel recommended that the GSX project be allowed to proceed to regulatory and departmental decision-making as long as the recommendations in its report are made part of the requirements of any approval by the NEB.

Pursuant to subsection 37(1.1) of the *CEAA* , responsible authorities shall take into consideration the Panel's report and, with the approval of the Governor in Council, respond to it. The purpose of this government response is to fulfill this requirement.

The Government of Canada accepts the Panel's recommendation that the GSX project be allowed to proceed to regulatory and departmental decision-making. Provided all environmental commitments made by GSX PL in its application for a Certificate under s.52 of the *NEBA* and undertakings made during the joint review are implemented, and the Panel's recommendations as supplemented and clarified by this response are implemented, the Government of Canada is satisfied that the GSX project is not likely to cause significant adverse environmental effects. Where departments and agencies, other than the NEB, have a regulatory decision to make in respect of the GSX project, the government response refers to additional requirements that are part of those departments' and agencies' regulatory processes.

The environmental assessment of the GSX project by the Panel under the *CEAA* is complete with the issuance of this response. Documents pertaining to follow-up programs under the *CEAA* to be implemented by GSX PL will be filed in the public registry maintained by the NEB.

The Government of Canada recognizes that some of the specifications of the GSX project have not yet been finalized and will be, through the regulatory and departmental decision-making processes. Effective monitoring, inspection and enforcement by regulators will ensure that all specifications of the GSX project will meet regulatory requirements from the construction through the decommissioning phases of the project.

Following the issuance of this response, the Panel will decide whether to issue a Certificate under the *NEBA*. The issuance of a Certificate under section 52 of the *NEBA* will be subject to Governor-in-Council approval.

RECOMMENDATIONS IN THE JOINT REVIEW PANEL REPORT

Recommendation 1

The Panel recommends that GSX PL complete all outstanding pre-construction surveys, not referenced in any other condition, for the terrestrial and marine portions of the pipeline as committed to during the GH-4-2001 proceeding and file the results with the Board for approval 60 days prior to the commencement of construction, including clearing or ground-breaking activities and marine pipe lay operations. The filing shall identify any potential adverse effects and any additional mitigative measures to be implemented.

Response

The Government of Canada accepts this recommendation subject to the following conditions. GSX PL is to consult with appropriate federal regulatory and science agencies, and submit survey results for review, well prior to forwarding them to the Board for approval. Before issuing any regulatory approvals or entering into any agreements, the Government of Canada will require the completion of previously identified pre-construction surveys by GSX PL. The basis for future federal permits and authorizations will hinge on Government of Canada experts' satisfaction with these study results and the adequacy of the mitigation measures identified. GSX PL will be expected to provide sufficient detail of the studies and other information, which reflect the particular requirements of the federal permits or authorizations.

Recommendation 2

The Panel recommends that GSX PL file with the Board for approval, 60 days prior to initiating the horizontal directional drill (HDD) at the Manley Creek landfall, a detailed site-specific environmental management plan. The plan should:

a. identify the potential hazards that could occur,

b. *identify all site-specific mitigation, habitat compensation, and monitoring requirements as required by Fisheries and Oceans Canada and Environment Canada;*

c. *identify additional containment systems (e.g., booms and seafloor control devices) that would be used to minimize the potential for mud releases beyond the limits of the glory hole;*

d. *specify that density adjustments to the drilling mud would only be made through the use of inert or non toxic materials;*

e. *discuss and include any mitigation for launching the HDD pipe string; and*

f. *include a monitoring plan to quantify the effects of drilling mud on marine vegetation at the HDD site.*

Response

The Government of Canada accepts this recommendation, subject to the following conditions, and notes its commitment to the effective management and monitoring of environmental effects.

The Government of Canada is committed to reviewing the environmental management plan with respect to any Government of Canada permits and authorizations. It is to GSX PL's advantage, therefore, to initiate discussions with DOE and DFO early on and involve them in the planning phase before submitting any such plan to the Board for approval.

A Disposal at Sea permit under Part 7 of CEPA, 1999 will be required for the HDD activity and the trenching associated with the installation of the pipeline. GSX PL must comply with the regulatory conditions of DOE. DOE will require additional information from GSX PL before a Disposal at Sea permit can be granted.

Early discussions with Government of Canada agencies benefits a more timely regulatory approvals process.

Additionally, GSX PL is to consult with appropriate federal agencies in determining what is suitable baseline information in developing the monitoring program noted by the Panel in their recommendation 2(f), since the recommendation is silent on this matter. Federal science expertise is available to GSX PL to assist in this exercise.

Recommendation 3

The Panel recommends that GSX PL not implement the open cut or partial horizontal directional drill (HDD) method as an alternative to the proposed HDD at Manley Creek until:

a. *GSX PL files with the Board detailed reasons why the HDD is not feasible or was not successful;*

b. *GSX PL consults with Environment Canada and Fisheries and Oceans Canada, obtains all necessary permits and files a detailed site-specific, open cut or partial HDD crossing plan and an eelgrass monitoring plan that includes scaled drawings identifying all areas that would be disturbed by constructing the crossing; and*

c. *receives written approval from the Board that an open cut or partial HDD crossing may begin.*

Response

The Government of Canada accepts this recommendation subject to the following conditions. Prior to filing any proposal for alternatives to HDD at Manley Creek with the Board, GSX PL must consult with DFO and DOE to discuss alternatives as well as to explain the rationale for changing or abandoning the plan to use HDD.

Any proposal for alternatives to HDD will require a Fisheries Act authorization. GSX PL must comply with the regulatory conditions of DFO; since regulatory approval is a subsequent step to the environmental assessment, DFO may require additional information from GSX PL before an authorization can be granted.

Recommendation 4

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a detailed pre-and post-construction monitoring and follow-up program. The plan shall include scientifically rigorous criteria to be used to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation developed for benthic flora and fauna along Cape Keppel near Ecological Reserve 67. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan with appropriate regulatory agencies, including Fisheries *and Oceans Canada, shall be provided. The follow-up program will include a schedule for filing reports to the Board.*

Response

The Government of Canada accepts this recommendation subject to the following conditions. DFO is committed to working with GSX PL in the development of a pre- and post construction monitoring and follow-up plan and will involve DOE and other federal agencies as appropriate. A detailed monitoring and follow-up plan is to be made available for approval by DFO prior to its submission for approval to the Board.

The Government of Canada acknowledges that this recommendation deals with a specific issue raised during the review and notes that DFO is working with GSX PL to develop monitoring and follow-up plans for other marine components in the Cape Keppel and Ecological Reserve 67 area.

Recommendation 5

Should the jetting construction method be considered for the marine portion of the pipeline, the Panel recommends GSX PL file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, the results of a specific sediment sampling plan for areas of the pipeline considered for installation using the jetting construction method. This report should include:

a. *a detailed statistically valid sampling protocol;*

b. *the results of the sediment sampling plan, indicating whether sediment in excess of Environment Canada's (2000) Interim Contaminant Testing Guidelines is discovered;*

c. *all mitigative measures GSX PL would implement should it be found that sediment in excess of Environment Canada's (2000) Interim Contaminant Testing Guidelines exists in the area that could be affected by the project;*

d. *copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan and mitigative measures with appropriate regulatory agencies, including Environment Canada and Fisheries and Oceans Canada; and*

e. *criteria to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation.*

Response

The Panel concludes that if the jetting construction method is considered for the marine portion of the pipeline, then appropriate approvals from the Board would be necessary. However, the Government of Canada does not accept the jetting construction method for this project.

DFO discussed the jetting construction method with GSX PL sometime prior to the oral hearing, indicating that jetting was a non-viable option. In light of the detrimental environmental effects of jetting, GSX PL has not included jetting in their Restoration and Compensation Plans, in favour of developing environmentally superior alternatives. DFO will continue to work with GSX PL on identifying construction alternatives with lesser environmental impacts than jetting.

Recommendation 6

The Panel recommends GSX PL file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a follow-up program to verify the accuracy of the environmental assessment predictions in relation to reef effects. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the program with appropriate regulatory agencies, including Environment Canada and Fisheries and Oceans Canada, shall be provided. The follow-up program shall include a schedule for filing reports to the Board.

Response

The Government of Canada accepts the recommendation subject to the following conditions. Compliance with this recommendation is to include reference to the baseline studies acceptable to the Government of Canada against which post-construction monitoring can be measured.

GSX PL should confirm that the follow-up program meets with the satisfaction/approval of DFO, DOE, and other federal agencies as appropriate prior to filing same with the Board.

Recommendation 7

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of marine pipe lay operations, a follow-up program on barrier effects. The follow-up program include:

a. *a schedule for filing subsequent reports with the Board which verify the accuracy of the environmental assessment predictions and assess the effectiveness of the mitigation developed for reducing barrier effects to benthic communities and include any further mitigation proposed by GSX PL;*

b. *copies of all correspondence and minutes of meetings demonstrating consultation with appropriate stakeholders, including, but not limited to, Environment Canada, and Fisheries and Oceans Canada, in developing the follow-up program;*

c. *a detailed approach to ensure that, in areas where the pipeline is trenched, a minimum of 50 per cent of its diameter for no less than 50 per cent of each 100 m linear section will be buried; and*

d. *an outline and schedule of the reports to be submitted on the results of year 1, 2, 3 and 5 post-construction crab trapping and tagging studies, and year 7 if deemed necessary by Fisheries and Oceans Canada and the reports shall include any further mitigation proposed by GSX PL.*

Response

The Government of Canada accepts this recommendation subject to the following conditions. The Government of Canada, and in particular DFO, is committed to working with GSX PL to develop a plan on reducing or eliminating barrier effects.

DFO could require reports more or less frequently than the schedule described in (d). Although the schedule suggested by the Panel appears reasonable, DFO is flexible in developing a mutual and effective reporting schedule more in line with GSX PL's activities. GSX PL's reports are to include reference to the baseline studies acceptable to the Government of Canada against which post-construction monitoring can be measured. The reports should be structured to meet with DFO's satisfaction prior to filing them with the Board.

Recommendation 8

The Panel recommends that GSX PL take all reasonable measures to construct the marine portion of the pipeline from October to April to minimize potential interactions with marine mammals. Should GSX PL determine that it is necessary for construction to extend beyond April, GSX PL shall file with the Board for approval at least 30 days prior to 30 April:

a. *information on the status of marine construction activities and an updated construction schedule, including the anticipated completion;*

b. *specific mitigation and monitoring plans that may be undertaken by GSX PL for construction activities outside the window; and*

c. *copies of all correspondence and minutes of meetings demonstrating consultation in developing the plans with appropriate regulatory agencies, including Fisheries and Oceans Canada.*

Response

The Government of Canada accepts the intent of the recommendation to restrict construction activities in areas of concern. However, DFO wishes to raise concerns regarding the timing in the Panel's recommendation for sensitive areas such as Boundary Pass where more stringent construction timing windows would have to apply. As noted in the Panel's report, DFO stated that the work window for the marine portion of the pipeline route seasonally utilized by the southern resident orcas should be confined to November-March for the protection of endangered resident orcas.

Southern resident orcas are assessed as being endangered (COSEWIC 2001) and are on Schedule I of the *Species at Risk Act (SARA)* . The prohibitions against harming, harassing, or killing the species will become effective on June 1, 2004. If construction activities occur after the prohibitions come into force, GSX PL will have to comply with *SARA* , as noted in the Panel's report. Critical habitat under *SARA* for this population remains to be determined, likely sometime before June 2006 when prohibitions on destruction of their critical habitat will also come into effect. The harbour porpoise's status is currently being reassessed by COSEWIC, and *SARA* prohibitions may also apply to this species depending on its future status.

Section 79 of *SARA*, which came into force on June 5, 2003, creates a duty to notify the appropriate federal Ministers when a project is likely to affect a listed wildlife species. Further, there is a duty to implement mitigation and monitoring measures to avoid or lessen such effects upon listed wildlife species. The Panel, recognizing section 79 of *SARA* , and aware of public concerns on this issue, notified the Minister of Fisheries and Oceans Canada on September 22, 2003 that a listed wildlife species (southern resident orcas) may be affected by the GSX project.

Following the release of the Panel report, GSX PL and DFO met to discuss this issue. GSX PL has agreed, in principle, to an acceptable work window, as required by DFO, in Boundary Pass. Discussions are continuing in regard to other construction activities of a lesser potential impact which may not necessarily require as strict an adherence to the November-March window.

Recommendation 9

The Panel recommends that GSX PL file a report setting out the results of its post-construction sound emission study with the Board for approval within 90 days of commencement of operation of the pipeline. The report shall include data gathered on sound emitted from the marine pipeline for the representative range of flow, pressure, compressor operating conditions and any other factor that may contribute to the sound emissions. Data should establish the level of sound emitted from the pipeline in relation to ambient noise levels and the distance this sound is propagated in the water column. Should the test results indicate that pipeline noise would be detectable to killer whales and harbour porpoises, GSX PL shall consult with Fisheries and Oceans and include in the report any additional mitigation measures it plans to implement to reduce the noise level.

Response

The Government of Canada accepts this recommendation subject to the following conditions. The Government of Canada notes that it is the responsibility of GSX PL to develop and implement mitigation measures. DFO's responsibility is to ensure that the mitigation measures are appropriate and are implemented.

Test results from the studies proposed by the Panel in its recommendations, along with conclusions based on these results, are to be are forwarded to DFO regardless of the outcome of the studies. DFO will review GSX PL's supporting data relevant to any suggested mitigation measures and advise of the need for changes as necessary. Sound during operations is expected to be below detectable levels for toothed whales and the studies recommended by the Panel will help to confirm or refute this.

Recommendation 10

The Panel recommends that GSX PL file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining the plan to test groundwater encountered during excavation for sewage constituents. The report shall:

a. *include a statement of the type of testing methodology to be used;*

b. *indicate the sewage constituents to be tested for;*

c. *include the acceptable levels of each constituent;*

d. *provide the frequency of testing; and*

e. *provide a mitigation and disposal plan for water found to exceed the acceptable limits.*

Response

The Government of Canada accepts the recommendation, and notes that groundwater is a matter of concern for both the Government of Canada and the province of BC. The territories and provinces have the major role in managing water. As a member of the Canadian Council of Ministers of the Environment, the Government of Canada is working in partnership with the territories and provinces on water quality guidance. The Government of Canada is prepared to work with the Province to provide advice on a plan to test groundwater encountered during excavation.

Recommendation 11

The Panel recommends that GSX PL file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining the plan to test wells 18200, 27402, 28298 and 29881 for yield and water quality prior to, during and after the HDD construction. The report shall:

a. *include a statement of the type of testing methodology to be used;*

b. *include the acceptable water quality level and well yield;*

c. *provide the frequency of testing;*

d. *include the duration of testing after the HDD construction; and*

e. *provide for any additional mitigative measures that would be implemented.*

Response

The Government of Canada accepts the recommendation, and notes that water quality is a matter of concern for both the Government of Canada and the province of BC.

Clean water is a priority with the Government of Canada. Most provincial and territorial agencies use the Guidelines for Canadian Drinking Water Quality as the basis for developing their own drinking water objectives and standards. The Government of Canada is prepared to work with the Province to provide advice on a plan to test wells to ensure proper water quality and yield.

Recommendation 12

The Panel recommends that GSX PL file for approval with the Board, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a report outlining a testing plan to ensure that, upon backfilling and compaction, trench backfill material has permeability properties consistent with the surrounding soils. The report shall:

a. *include pre-construction in-situ field testing;*

b. *include the infiltration test procedure to be used;*

c. *provide the criteria for determination of acceptable permeability range limits relative to existing conditions;*

d. *provide the frequency of testing; and*

e. *include a mitigation plan if permeability is found to be outside acceptable limits.*

Response

The Government of Canada accepts the recommendation, and notes that groundwater quality is a matter of concern for both the Government of Canada and the province of BC. Clean water is a priority with the Government of Canada. The Government of Canada is prepared to work with the Province to develop an adequate testing plan to ensure that local groundwater hydrology is not disrupted in the vicinity of the pipeline trench.

Recommendation 13

The Panel recommends that GSX PL offer to conduct, for those landowners with wells located within 50 m of the pipeline ROW and within 300 m of blasting activities, detailed pre-construction water well analyses to acquire baseline information about water quality and well function including yield. Following completion of construction activities, GSX PL shall offer to conduct additional water well monitoring and analyses, for those landowners who agreed to pre-construction analyses, to confirm no adverse effects. If the analyses demonstrate an effect (deterioration in water quality or well yield) on a specific water well due to GSX PL's activities, it shall undertake corrective action to address any effects. GSX PL shall document and respond to any complaints received concerning water quality or well function for two years following construction. GSX PL shall file with the Board within 14 days of receiving the complaint, a summary of the issue and a discussion of its resolution, or a proposed action plan.

Response

The Government of Canada accepts this recommendation, and notes that groundwater quality is a matter of concern for both the Government of Canada and the province of BC. The territories and provinces have the major role in managing water. As a member of the Canadian Council of Ministers of the Environment, the Government of Canada is working in partnership with the territories and provinces on water quality guidance. Well water monitoring and analyses are of benefit to all.

Recommendation 14

The Panel recommends that GSX PL offer to conduct, for those landowners with inhabited structures within 50 m of the pipeline ROW, detailed pre-blast structural assessments. Following construction, GSX PL shall offer to conduct post-blast structural assessments, for those landowners who agreed to pre-blast structural assessments. If the assessments demonstrate an effect on a specific inhabited structure due to GSX PL's activities, it shall undertake corrective action to address any effects. GSX PL shall document and respond to any complaints received concerning blasting effects on inhabited structures for two years following construction. GSX PL shall file with the Board within 14 days of receiving the complaint, a summary of the issue and a discussion of its resolution, or a proposed action plan.

Response

The Government of Canada accepts this recommendation.

Recommendation 15

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, the qualifications and experience of the Environmental Inspectors and Soil Specialist(s) who will be used on the Project.

Response

The Government of Canada accepts this recommendation.

Recommendation 16

The Panel recommends that GSX PL file with the Board, at least 21 days prior to the commencement of clearing of vegetation or ground-breaking activities, the methodology and results of a pre-construction survey for federally and provincially listed plant species of concern along the entire terrestrial portion of the ROW. Where plant species of concern could be affected by construction activities, GSX PL shall also file a detailed mitigation plan for approval, including copies of all correspondence and minutes of meetings demonstrating consultation in developing the plan with appropriate regulatory agencies, including Environment Canada.

Response

The Government of Canada accepts this recommendation, and notes that although DOE is specifically referenced, plant species along the terrestrial portion of the right-of-way is a matter of concern for both the Government of Canada and the province of BC. GSX PL should advise the appropriate provincial agency as soon as possible in the event that species identified on Schedule I of the *SARA* are located in an area where they may be affected by the GSX project.

Parks Canada chairs, and DOE is represented on, the Garry Oak Ecosystem Recovery Team. Parks Canada and DOE are available to provide advice in this capacity.

Recommendation 17

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities, a follow-up program to verify the accuracy of the environmental assessment predictions and to assess the effectiveness of the mitigation developed for snow-white rein orchid, slender woolly heads, California-tea, and any other federally and provincially listed plant species of concern discovered during the pre-construction surveys. Copies of all correspondence and minutes of meetings demonstrating consultation in developing the program with appropriate regulatory agencies, including Environment Canada, shall be provided. The follow-up program shall include a schedule for filing reports with the Board.

Response

The Government of Canada accepts this recommendation, and notes that although DOE is specifically referenced, plant species along the terrestrial portion of the right-of-way is a matter of concern for both the Government of Canada and the province of BC. DOE is prepared to consult with GSX PL in areas within its mandate. GSX PL should also work with the appropriate provincial agency as soon as possible in the event that species identified on Schedule I of *SARA* are located in an area where they may be affected by the GSX project.

Recommendation 18

The Panel recommends that GSX PL file with the Board, at least 21 days prior to the commencement of clearing of vegetation or ground-breaking activities, the results of an additional detailed breeding bird survey to determine the presence of active nests of breeding birds within 100 m of areas to be disturbed during construction. Where active nests of breeding birds are observed, GSX PL shall also file a detailed mitigation plan for approval, including copies of all correspondence and minutes of meetings demonstrating consultation with appropriate regulatory agencies, including Environment Canada, in developing the plan.

Response

The Government of Canada accepts this recommendation subject to the following conditions. The timing of the nest surveys is crucial depending on the time of year. Similarly, the 100 m distance specified may or may not be appropriate. GSX PL is to consult with DOE prior to the implementation of surveys to ensure survey timing and distances are appropriate. If a species identified on Schedule I of *SARA* is found during the surveys, GSX PL is responsible to advise the appropriate agency as soon as it is discovered.

Recommendation 19

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of clearing of vegetation or ground-breaking activities or within a time otherwise directed by the Board, a heritage resource impact assessment, including any additional mitigation measures, for the portions of the ROW not previously surveyed. The filing shall also include any comments and recommendations on this assessment and proposed mitigation from the British Columbia Ministry of Sustainable Resource Management, Archaeology Branch, with a statement on whether GSX PL intends to implement the recommendations.

Response

The Government of Canada accepts this recommendation. Parks Canada is available to offer advice with respect to the heritage resource impact assessment if called upon to do so. The Government of Canada believes that provincial authorities may also be available to offer advice on these matters.

Recommendation 20

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of HDD operations or marine pipe lay operations whichever is sooner, or within a time otherwise directed by the Board, any comments and recommendations on the underwater archaeological assessment and the proposed mitigation from the British Columbia Ministry of Sustainable Resource Management, Archaeology Branch, and a statement on whether GSX PL intends to implement the recommendations.

Response

The Government of Canada accepts this recommendation. Parks Canada agrees with the need for an underwater archaeological assessment and is available to offer advice if called upon to do so. The Government of Canada believes that provincial authorities may also be able to offer advice on these matters.

Recommendation 21

The Panel recommends that GSX PL cause the approved facilities to be designed, manufactured, located, constructed, installed and operated in accordance with those specifications, drawings, schedules, and other information or data set forth in its Application or as otherwise adduced in evidence before the Panel during the GH-4-2001 proceeding.

Response

The Government of Canada accepts this recommendation.

Recommendation 22

The Panel recommends that GSX PL maintain at its construction office(s):

a. *copies of any permits, approvals or authorizations for the applied-for facilities issued by federal, provincial or other permitting agencies, which include environmental conditions or site-specific mitigative or monitoring measures; and*

b. *any subsequent variations to any permits, approvals or authorizations.*

Response

The Government of Canada accepts this recommendation. DOE and DFO expect GSX PL to display regulatory approvals, codes of practice, etc., on site. On-site storage of copies of the pertinent permits, approvals, and authorizations is a standard requirement and will allow for quick reference by inspectors to help ensure that permit conditions are being met.

Recommendation 23

The Panel recommends that GSX PL implement or cause to be implemented all of the policies, practices, recommendations, procedures, and commitments for the protection of the environment and the promotion of safety referred to in its Application, or as otherwise adduced in evidence before the Panel during the GH-4-2001 proceeding.

Response

The Government of Canada accepts this recommendation and notes that documents that consolidate the policies, practices, recommendations, procedures and commitments developed to mitigate the potential adverse environmental effects of the GSX project and enunciated throughout the environmental assessment, will facilitate adherence to these commitments during the life span of the GSX project.

Recommendation 24

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, updated copies of its Marine, Terrestrial, and Landfall Environmental Protection and Reclamation Plans (EPRPs) and Environmental Alignment Sheets that include all environmental commitments and site-specific mitigative measures made in respect of the Application. The Panel recommends that GSX PL implement the approved EPRPs.

Response

The Government of Canada accepts this recommendation. DFO will reference the plans and alignment sheets where appropriate in any *Fisheries Act* authorization that is issued.

Recommendation 25

The Panel recommends that GSX PL file with the Board for approval, at least 60 days prior to the commencement of construction (which for the terrestrial portion of the pipeline means clearing of vegetation or ground-breaking activities and for the marine portion of the pipeline means the initiation of pipe lay operations) or within a time otherwise directed by the Board, a detailed outline of information related to environmental protection measures that will be presented to all field personnel during a project-specific environmental training program.

Response

The Government of Canada accepts this recommendation subject to the following condition. GSX PL is to consult with DFO, DOE, and other federal departments and agencies as appropriate, regarding the need to submit relevant components for review before submitting these to the Board.

Recommendation 26

The Panel recommends that GSX PL file with the Board, within six months of the date that the facilities are placed into service, and on or before the 31 January that follows each of the first, second, and third complete growing seasons, a report that:

a. *identifies the status of any new or outstanding environmental issues for the terrestrial, landfall, and marine portion of the pipeline;*

b. *provides a description of the measures GSX PL proposes to take in respect of any new or outstanding environmental issues;*

c. *provides an assessment of the effectiveness of mitigative measures undertaken on the terrestrial, landfall and marine pipeline ROW, including final clean-up and reclamation on the terrestrial and landfall portion of the ROW; and*

d. *contains As-Built Alignment Sheets.*

Response

The Government of Canada accepts this recommendation subject to the following condition. This recommendation is consistent with the typical requirements of federal regulatory approvals, permits and authorizations. DOE and DFO may not necessarily subscribe to the Panel's scheduling recommendations. If the early results of monitoring programs indicate that changes are occurring more rapidly than foreseen, more frequent issues identification and reporting may be required to allow responses to be developed in an effective and timely manner. Any federal permits or authorizations will reflect the need for flexibility of this nature.